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## SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Laura Dewar Examiner #: 71724 Date: 10-27-03  
 Art Unit: 1745 Phone Number 30 8496 Serial Number: 09/926779  
 Mail Box and Bldg/Room Location: 8E10 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

\*\*\*\*\*

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: \_\_\_\_\_

Inventors (please provide full names): See Front Sheet

Earliest Priority Filing Date: \_\_\_\_\_

\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Could you search for an electrolyte comprising a  
 solvent comprising a vinylethylene carbonate compound  
 represented by Formula (I)

Thanks,  
 Laura

\$1187.78

Please send back copy of claims & abstract

## STAFF USE ONLY

## Type of Search

## Vendors and cost where applicable

Searcher: X NA Sequence (#) \_\_\_\_\_ STN ✓  
 Searcher Phone #: \_\_\_\_\_ AA Sequence (#) \_\_\_\_\_ Dialog \_\_\_\_\_  
 Searcher Location: \_\_\_\_\_ Structure (#) \_\_\_\_\_ Questel/Orbit \_\_\_\_\_  
 Date Searcher Picked Up: 10/28/03 Bibliographic ✓ Dr. Link \_\_\_\_\_  
 Date Completed: 10/28/03 Litigation \_\_\_\_\_ Lexis/Nexis \_\_\_\_\_  
 Searcher Prep & Review Time: 120 Fulltext \_\_\_\_\_ Sequence Systems \_\_\_\_\_  
 Clerical Prep Time: \_\_\_\_\_ Patent Family \_\_\_\_\_ WWW/Internet \_\_\_\_\_  
 Online Time: 120 Other \_\_\_\_\_ Other (specify) \_\_\_\_\_



# STIC Search Report

## EIC 1700

STIC Database Tracking Number: 106772

**TO: Laura Weiner**

**Location:**

**Art Unit : 1745**

**October 27, 2003**

**Case Serial Number: 09/926779**

**From: John Calve**

**Location: EIC 1700**

**CP3/4-3D62**

**Phone: 308-4139**

**John.Calve@uspto.gov**

### Search Notes

Hi Laura,

Since the R groups for the compound of claim 1 can all be hydrogen, I used the registry number that was indexed for this application (where R1-R6 are all hydrogen).

If you have any questions, please feel free to call me.

John 308-4139

=> file hca

FILE 'HCA' ENTERED AT 14:35:35 ON 27 OCT 2003

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FILE COVERS 1907 - 23 Oct 2003 VOL 139 ISS 18

FILE LAST UPDATED: 23 Oct 2003 (20031023/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d his

(FILE 'HOME' ENTERED AT 13:54:51 ON 27 OCT 2003)

FILE 'HCA' ENTERED AT 13:55:07 ON 27 OCT 2003

L1 5315 S SHIMA ?/AU  
L2 11 S KOTATO ?/AU  
L3 4 S L1 AND L2  
L4 32995 S FUJII ?/AU  
L5 124202 S SUZUKI ?/AU  
L6 2 S L3 AND L4  
L7 1 S L6 AND L5  
SEL L7 RN

FILE 'REGISTRY' ENTERED AT 13:56:20 ON 27 OCT 2003

L8 7 S E1-E7  
L9 1 S L8 AND ?ETHENYL?/CNS

FILE 'HCA' ENTERED AT 13:57:54 ON 27 OCT 2003

L10 70 S L9  
L11 240825 S FUELCELL? OR BATTERY? OR BATTERIES? OR (FUEL? OR ELECTROCHEM?  
L12 39 S L10 AND L11

FILE 'LCA' ENTERED AT 13:59:56 ON 27 OCT 2003

L13 0 S VINYLETHYLENE#(N)CARBONAT### OR VINYL#(N)ETHYLENE#(N)CARBONAT  
L14 1 S LITHIUM(2N)?FLUOROPHOSPHATE?

FILE 'HCA' ENTERED AT 14:05:18 ON 27 OCT 2003

L15 99 S L13  
L16 3156 S L14  
L17 42 S L15 AND L11  
L18 43 S L12 OR L17  
L19 24 S L18 AND L16  
L20 34698 S NONAQ## OR NONAQUEOUS##  
L21 7383 S L20(2N)ELECTROLYT?  
L22 21 S L19 AND L21

L23 20 S L22 NOT (L3 OR L6 OR L7)  
L24 1532 S LIPF6  
L25 4 S L23 AND L24  
L26 20 S L23 OR L25  
L27 797834 S ELECTROD? OR ANOD? OR CATHOD?  
L28 14 S L26 AND L27

FILE 'LCA' ENTERED AT 14:09:58 ON 27 OCT 2003

L29 3 S LIPF6 OR LIBF4 OR LICF3SO3 OR LIN(N)CF3CF2SO2  
L30 87 S (PROPYLENE OR ETHYLENE#) (2N)CARBONAT? OR ?BUTYROLACTONE? OR

FILE 'HCA' ENTERED AT 14:13:56 ON 27 OCT 2003

L31 3344 S L29  
L32 32798 S L30  
L33 1131250 S GRAPHITE# OR CARBON

FILE 'REGISTRY' ENTERED AT 14:15:35 ON 27 OCT 2003

L34 1 S L8 AND GRAPHITE

FILE 'HCA' ENTERED AT 14:15:55 ON 27 OCT 2003

L35 86296 S L34  
L36 1132754 S L35 OR L33  
L37 4 S L26 AND L29  
L38 4 S L26 AND L35  
L39 4 S L38 AND L36  
L40 7 S L25 OR L37 OR L38 OR L39  
L41 20 S L26 OR L28  
L42 13 S L41 NOT L40  
L43 20 S L26 OR L28 OR L41 OR L40  
L44 4 S L43 AND 1907-1999/PY, PRY  
L45 10 S L43 AND 1907-2000/PY, PRY  
L46 10 S L43 NOT L45  
L47 6 S L45 NOT L44

FILE 'WPIX' ENTERED AT 14:20:58 ON 27 OCT 2003

FILE 'JAPIO, WPIX' ENTERED AT 14:21:31 ON 27 OCT 2003

L48 349303 S L11  
L49 83 S L13  
L50 240 S L14  
L51 9788 S L20  
L52 6046 S L51 (2N)ELECTROL?  
SET MSTEPS ON  
L53 0 FILE JAPIO  
L54 2 FILE WPIX  
TOTAL FOR ALL FILES  
L55 2 S L49 AND L50  
L56 16 FILE JAPIO  
L57 30 FILE WPIX  
TOTAL FOR ALL FILES  
L58 46 S L48 AND L49  
L59 102 FILE JAPIO  
L60 883 FILE WPIX  
TOTAL FOR ALL FILES  
L61 985 S L24 OR L29 OR LIPF6  
L62 463164 FILE JAPIO  
L63 598276 FILE WPIX  
TOTAL FOR ALL FILES  
L64 1061440 S L27  
L65 3186 FILE JAPIO

L66 7650 FILE WPIX  
TOTAL FOR ALL FILES  
L67 10836 S L30  
L68 145372 FILE JAPIO  
L69 339142 FILE WPIX  
TOTAL FOR ALL FILES  
L70 484514 S L33  
SET MSTEPS OFF  
L71 15325 S CYCLIC?(3N)CARBONATE? OR LACTONE?  
L72 1828476 S POLYMER## OR HOMOPOLYMER## OR COPOLYMER## OR TERPOLYMER## OR  
L73 973 S L71(2N)L72  
L74 17 S L73 AND L48  
L75 63 S L74 OR L58  
L76 8 S L75 AND L61  
L77 27 S L75 AND L72  
L78 7 S L77 AND L70  
L79 21 S L77 AND L64  
L80 4 S L79 AND L20  
L81 43427 S LATTICE##  
L82 0 S (L77 OR L79) AND L81  
L83 3 S L75 AND L81  
SET MSTEPS ON  
L84 3 FILE JAPIO  
L85 14 FILE WPIX  
TOTAL FOR ALL FILES  
L86 17 S L76 OR L78 OR L80 OR L83

FILE 'HCA' ENTERED AT 14:35:21 ON 27 OCT 2003

FILE 'HCA' ENTERED AT 14:35:35 ON 27 OCT 2003

=> d L44 1-4 cbib abs hitind hitrn

L44 ANSWER 1 OF 4 HCA COPYRIGHT 2003 ACS on STN  
135:21952 **Nonaqueous electrolyte** solutions and secondary  
**batteries** using the electrolyte solutions. Obata, Kenzo; Isada,  
Katsuya; Murakami, Akinori; Susuda, Hiroshi; Nakamura, Shinichiro; Kotado,  
Minoru; Suzuki, Hitoshi (Mitsubishi Chemical Corp., Japan). Jpn. Kokai  
Tokkyo Koho JP 2001155768 A2 20010608, 10 pp. (Japanese). CODEN: JKXXAF.  
APPLICATION: JP 1999-339758 19991130.

GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB The electrolyte solns. contain a solute and an org. solvent, which  
contains a carbonate I-IX [A, B, D, E, F, G, R1-32 = H or various  
(halogenated) hydrocarbon groups and may join together forming rings];  
where the C atom (not in a CH3 group) assocd. with the carbonate group has  
a Mulliken population .ltoreq. -0.17, based on the most suitable anionic  
state calcd. by non-exptl. 3-21G corelation mol.-orbital using the UHF  
method. The carbonate is selected from various linear and cyclic  
carbonate esters.

IC ICM H01M010-40  
ICS H01M010-40

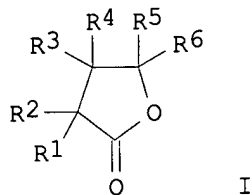
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST secondary **battery** electrolyte solvent carbonate ester UHF  
specification

- IT **Battery electrolytes**  
(carbonate ester additives with controlled mol.-orbital characteristics  
in electrolyte solvents for secondary lithium **batteries**)
- IT 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 21324-40-3,  
**Lithium hexafluorophosphate**  
RL: DEV (Device component use); USES (Uses)  
(carbonate ester additives with controlled mol.-orbital characteristics  
in electrolyte solvents for secondary lithium **batteries**)
- IT 4427-92-3, Phenylethylene carbonate **4427-96-7**,  
**Vinylethylene carbonate**  
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)  
(carbonate ester additives with controlled mol.-orbital characteristics  
in electrolyte solvents for secondary lithium **batteries**)
- IT **4427-96-7, Vinylethylene carbonate**  
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)  
(carbonate ester additives with controlled mol.-orbital characteristics  
in electrolyte solvents for secondary lithium **batteries**)

L44 ANSWER 2 OF 4 HCA COPYRIGHT 2003 ACS on STN

134:103244 Secondary **nonaqueous electrolyte batteries**. Oura, Takafumi; Iwamoto, Kazuya; Nakanishi, Shinji; Ueda, Atsushi; Koshina, Hizuru (Matsushita Electric Industrial Co., Ltd., Japan; Mitsubishi Chemical Corporation). PCT Int. Appl. WO 2001003228 A1 20010111, 21 pp. DESIGNATED STATES: W: CN, KR, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2000-JP4293 20000629. PRIORITY: JP 1999-188740 19990702.

GI



- AB The **batteries** use an electrolyte soln. contg. an **electrolyte** in a **nonaq.** solvent, which contains a cyclic carbonate ester and a cyclic carbonate ester having .gtoreq.1 unsatd. C-C bonding. The cyclic carbonate ester is preferably .gamma.-butyrolactone or I, where R1-6 = H, halogen, or C1-6 alkyl or acetyl groups, and R4 and R5 may join together by a double bond.
- IC ICM H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST secondary **battery electrolyte nonaq** solvent  
mixt; cyclic carbonate ester secondary **battery** electrolyte;  
unsatd cyclic carbonate ester **battery** electrolyte
- IT **Battery electrolytes**  
(**nonaq.** solvent mixts. contg. cyclic carbonate esters and  
unsatd. cyclic carbonate esters for secondary lithium **batteries**)
- IT 96-48-0, .gamma.-Butyrolactone 108-29-2, .gamma.-Valerolactone  
517-23-7, .alpha.-Acetyl .gamma.-butyrolactone 591-12-8,  
.alpha.-Angelicalactone 872-36-6, Vinylene carbonate 1679-47-6,  
.alpha.-Methyl-.gamma.-butyrolactone **4427-96-7**,  
**Vinylethylene carbonate** 21324-40-3, **Lithium**

**hexafluorophosphate**

RL: DEV (Device component use); USES (Uses)

(nonaq. solvent mixts. contg. cyclic carbonate esters and unsatd. cyclic carbonate esters for secondary lithium **batteries**)IT **4427-96-7, Vinylethylene carbonate**

RL: DEV (Device component use); USES (Uses)

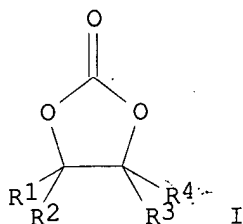
(nonaq. solvent mixts. contg. cyclic carbonate esters and unsatd. cyclic carbonate esters for secondary lithium **batteries**)

L44 ANSWER 3 OF 4 HCA COPYRIGHT 2003 ACS on STN

132:110664 **Nonaqueous electrolytes** for secondary

**batteries** and the **batteries**. Toiida, Masahiro; Tan, Hiroaki; Mita, Akiko; Ishida, Tatsuyoshi; Ishitoku, Takeshi (Mitsui Chemicals Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2000040526 A2 20000208, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-138467 19990519. PRIORITY: JP 1998-138782 19980520.

GI



AB The electrolytes contain a cyclic carbonate ester I [R1-4 = H, C1-7 alkyl, non-conjugated unsatd. C2-7 hydrocarbon, -CH2OR5 (R5 = C1-7 alkyl or non-conjugated unsatd. C2-7 hydrocarbon), or -CH2OCOR6 (R6 = C1-7 alkyl or non-conjugated unsatd. C2-7 hydrocarbon), with .gtoreq.1 of R1-4 has a non-conjugated unsatd. bonding.]. The **batteries** using the electrolytes have Li intercalating carbonaceous **anodes**.

ICM H01M010-40

ICS C07D317-34; H01M004-02; H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium **battery** electrolyte carbonate ester solvent;cyclic carbonate ester **battery** electrolyte solventIT **Battery** electrolytes(electrolyte solvent mixts. contg. cyclic carbonate esters with unsatd. side chains for secondary lithium **batteries**)IT 826-29-9 **4427-96-7** 13818-44-5 15896-04-5 96548-13-9

RL: DEV (Device component use); USES (Uses)

(cyclic carbonate esters with unsatd. side chains in electrolyte solvent for secondary lithium **batteries**)

IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 21324-40-3,

**Lithium hexafluorophosphate**

RL: DEV (Device component use); USES (Uses)

(electrolyte solvent mixts. contg. cyclic carbonate esters with unsatd. side chains for secondary lithium **batteries**)IT **4427-96-7**

RL: DEV (Device component use); USES (Uses)

(cyclic carbonate esters with unsatd. side chains in electrolyte solvent for secondary lithium **batteries**)

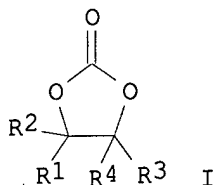
L44 ANSWER 4 OF 4 HCA COPYRIGHT 2003 ACS on STN

132:80930 **Nonaqueous-electrolyte** solutions containing



cyclic carbonates and phosphates for secondary **batteries** and the **batteries**. Omi, Takehiko; Tan, Hiroaki; Mita, Satoko; Ishida, Tatsuyoshi; Ishitoku, Takeshi (Mitsui Chemicals Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2000012080 A2 20000114, 10 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1998-172841 19980619.

GI



- AB The title electrolyte solns. contain cyclic carbonate esters I (R1-R4 = H or C1-7 alkyl; C2-7 hydrocarbyl contg. nonconjugated unsatd. bond, CH2OR5, or CH2OCOR6; R5,R6 = C1-7 alkyl or C2-7 hydrocarbyl contg. nonconjugated unsatd. bond; .gtoreq.1 of R1-R4 contain nonconjugated unsatd. bond) and phosphoric acid esters. The **batteries** are equipped with **anodes** contg. Li, Li alloys, Li-intercalating carbon materials, **cathodes** contg. Li transition metal oxides and carbon materials, and the above electrolytes. The **batteries** have good fire resistance and self-extinguishing properties.
- IC ICM H01M010-40  
ICS C07D317-34; C07D317-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST cyclic carbonate ester **nonaq electrolyte solvent**;  
lithium **battery** electrolyte carbonate phosphoric ester; fire  
resistance lithium **battery**
- IT **Battery** electrolytes  
Safety  
(electrolyte solns. contg. cyclic carbonates and phosphates for nonaq. **batteries** with self-extinguishing properties)
- IT Secondary **batteries**  
(lithium; electrolyte solns. contg. cyclic carbonates and phosphates for nonaq. **batteries** with self-extinguishing properties)
- IT 96-49-1, Ethylene carbonate 512-56-1, Trimethyl phosphate 616-38-6,  
Dimethyl carbonate 826-29-9 13818-44-5 15896-04-5 96548-13-9  
RL: DEV (Device component use); USES (Uses)  
(electrolyte solns. contg. cyclic carbonates and phosphates for nonaq. **batteries** with self-extinguishing properties)
- IT 21324-40-3, Lithium hexafluorophosphate  
RL: DEV (Device component use); USES (Uses)  
(electrolytes; electrolyte solns. contg. cyclic carbonates and phosphates for nonaq. **batteries** with self-extinguishing properties)
- IT 4427-96-7, Vinyl ethylene carbonate  
RL: DEV (Device component use); USES (Uses)  
(solvents; electrolyte solns. contg. cyclic carbonates and phosphates for nonaq. **batteries** with self-extinguishing properties)
- IT 4427-96-7, Vinyl ethylene carbonate  
RL: DEV (Device component use); USES (Uses)  
(solvents; electrolyte solns. contg. cyclic carbonates and phosphates for nonaq. **batteries** with self-extinguishing properties)

=> d L47 1-6 cbib abs hitind hitrn

L47 ANSWER 1 OF 6 HCA COPYRIGHT 2003 ACS on STN

137:81358 Ethylene carbonate-.gamma.-butyrolactone-based **nonaqueous electrolytes** for secondary **batteries**. Sekino, Masahiro; Satoh, Asako; Fujiwara, Masashi; Hasebe, Hiroyuki (Japan). U.S. Pat. Appl. Publ. US 2002086216 A1 (20020704, 25 pp., Cont.-in-part of U. S. Ser. No.961,138. (English). CODEN:USXXCO. APPLICATION: US 2001-26816 20011227. PRIORITY: JP 2000-296074 20000928; US 2001-961138 20010924; JP 2001-338586 20010928.

AB A **nonaq. electrolyte**, preferably in the form of a gel or liq., for a secondary **battery** consists of 20-50 vol.% ethylene carbonate and 40-80 vol.% .gamma.-butyrolactone, and includes a third solvent selected from ethylene sulfite, phenylethylene carbonate, 2-methylfuran, furan, thiophene, catechol carbonate, and **vinylethylene carbonate**. Optionally, the **battery** electrolyte can also contain a lithium salt as a solute, selected from LiClO<sub>4</sub>, **LiPF<sub>6</sub>**, **LiBF<sub>4</sub>**, LiAsF<sub>6</sub>, **LiCF<sub>3</sub>SO<sub>3</sub>**, LiN(CF<sub>3</sub>SO<sub>2</sub>)<sub>2</sub>, and LiN(C<sub>2</sub>F<sub>5</sub>SO<sub>2</sub>)<sub>2</sub>. Under charge-discharge cycle tests at 45.degree., the capacity retention rate at the 100th charge-discharge cycle is .gtoreq.85% of the discharge capacity in the first charge-discharge cycle.

IC ICM H01M010-40

ICS H01M002-02; H01M004-58

NCL 429330000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary **battery nonaq electrolyte** lithium

salt; ethylene carbonate butyrolactone **nonaq electrolyte**  
secondary **battery**

IT **Battery electrolytes**

(**nonaq.**, for secondary **batteries**; ethylene carbonate-.gamma.-butyrolactone-based **nonaq. electrolytes** for secondary **batteries**)

IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 110-00-9, Furan 110-02-1, Thiophene 534-22-5, 2-Methylfuran 2171-74-6, 1,3-Benzodioxol-2-one 3741-38-6, Ethylene sulfite 4427-92-3, Phenylethylene carbonate 4427-96-7, **Vinylethylene carbonate**

RL: TEM (Technical or engineered material use); USES (Uses)

(electrolytes contg.; ethylene carbonate-.gamma.-butyrolactone-based **nonaq. electrolytes** for secondary **batteries**)

IT 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, **Lithium hexafluorophosphate** 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium trifluoromethanesulfonate 90076-65-6, Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt 132843-44-8, Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-[(pentafluoroethyl)sulfonyl]-, lithium salt

RL: TEM (Technical or engineered material use); USES (Uses)

(solute, **nonaq. electrolyte** contg.; ethylene carbonate-.gamma.-butyrolactone-based **nonaq. electrolytes** for secondary **batteries**)

IT 4427-96-7, **Vinylethylene carbonate**

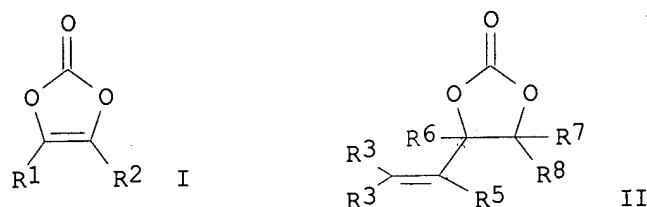
RL: TEM (Technical or engineered material use); USES (Uses)

(electrolytes contg.; ethylene carbonate-.gamma.-butyrolactone-based **nonaq. electrolytes** for secondary **batteries**)

L47 ANSWER 2 OF 6 HCA COPYRIGHT 2003 ACS on STN

137:65739 Flame-retardant **nonaqueous electrolyte** solution and secondary lithium **battery** using it. Yasukawa, Hideki; Ishigaki, Kenichi; Kotado, Minoru; Fujii, Takashi (Mitsubishi Chemical Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002190316 A2 20020705, 10 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-390188 20001222.

GI



AB The electrolyte soln. comprises Li salts dissolved in an nonaq. solvent. The nonaq. solvent contains (a) cyclic carboxylic acid ester, (b) carbonic acid ester, and (c) phosphoric acid ester, and vinylene carbonate I (R1-2 = H, C1-4 alkyl) and/or **vinylethylene carbonate** II (R3-8 = H, C1-4 alkyl) are added to the solvent. The Li **battery** using the electrolyte soln. is also claimed. The electrolyte soln. shows excellent self fire-extinguishing performance and has high elec. cond. and electrochem. stability.

IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 28

ST flame retardant **nonaq electrolyte** soln carbonate additive lithium **battery**; carboxylate carbonate phosphate flame retardant **nonaq electrolyte** lithium **battery**

IT **Battery electrolytes**

Fire-resistant materials

(flame-retardant **nonaq. electrolyte** soln. contg. carbonate compd. as additive for Li **battery**)

IT 872-36-6, Vinylene carbonate **4427-96-7**

RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)  
(flame-retardant **nonaq. electrolyte** soln. contg. carbonate compd. as additive for Li **battery**)

IT 14283-07-9, Lithium tetrafluoroborate 21324-40-3, **Lithium hexafluorophosphate**

RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)

(flame-retardant **nonaq. electrolyte** soln. contg. carbonate compd. as additive for Li **battery**)

IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 104-50-7, .gamma.-Octanolactone 105-58-8, Diethyl carbonate 108-29-2, .gamma.-Valerolactone 108-32-7, Propylene carbonate 502-44-3, .epsilon.-Caprolactone 512-56-1 542-28-9, .delta.-Valerolactone 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 623-96-1, Di-n-propyl carbonate 695-06-7, .gamma.-Caprolactone 823-31-4, Ethyl ethylene phosphate 867-17-4, Diethyl methyl phosphate 3068-88-0, .beta.-Butyrolactone 4437-85-8, Butylene carbonate 6482-34-4, Diisopropyl carbonate 10463-05-5, Dimethyl ethyl phosphate 10463-06-6, Butyl dimethyl phosphate 35363-39-4, Ethyl isopropyl carbonate 35363-40-7 51729-83-0, Methyl isopropyl carbonate

56525-42-9 59259-32-4, Dimethyl propyl phosphate 119812-13-4  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(nonaq. solvent; flame-retardant **nonaq. electrolyte**  
soln. contg. carbonate compd. as additive for Li **battery**)

IT 4427-96-7

RL: DEV (Device component use); MOA (Modifier or additive use); TEM  
(Technical or engineered material use); USES (Uses)  
(flame-retardant **nonaq. electrolyte** soln. contg.  
carbonate compd. as additive for Li **battery**)

L47 ANSWER 3 OF 6 HCA COPYRIGHT 2003 ACS on STN

137:8606 **Nonaqueous electrolyte** solution and secondary  
**battery** using the solution. Hinohara, Akio; Matsuoka, Osamu  
(Mitsui Chemicals Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2002158035 A2  
20020531, 15 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-353543  
20001120.

AB The electrolyte soln. has redn. peak intensities .ltoreq.200 .mu.A/cm2  
between 0.3-0.6 V at 25.degree., on its 1st scan on its cyclovoltammogram  
scanned at 10 mV/s between 0 and 3 V, using a highly oriented pyrolytic  
graphite working **electrode** and a Li ref. **electrode**.  
Preferably, the electrolyte soln. contains additives selected compd.  
having a norbornene structure and/or benzenesulfonic acid derivs. The  
**battery** is a secondary Li **battery**.

IC ICM H01M010-40

ICS H01M004-02; H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium **battery** electrolyte soln cyclovoltammogram  
redn peak; norbornene additive lithium **battery** electrolyte;  
benzenesulfonic acid deriv lithium **battery** electrolyte additive

IT **Battery** electrolytes

(norbornene and benzenesulfonic acid deriv. additives in **nonaq**  
. **electrolyte** solns. for secondary lithium **batteries**  
)

IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate  
4427-96-7, Vinyl ethylene carbonate

21324-40-3, Lithium hexafluorophosphate

RL: DEV (Device component use); USES (Uses)

(norbornene and benzenesulfonic acid deriv. additives in **nonaq**  
. **electrolyte** solns. for secondary lithium **batteries**  
)

IT 81-08-3 121-53-9D, m-Sulfo benzoic acid, dipotassium salt 826-62-0  
58601-47-1

RL: MOA (Modifier or additive use); USES (Uses)

(norbornene and benzenesulfonic acid deriv. additives in **nonaq**  
. **electrolyte** solns. for secondary lithium **batteries**  
)

IT 4427-96-7, Vinyl ethylene carbonate

RL: DEV (Device component use); USES (Uses)

(norbornene and benzenesulfonic acid deriv. additives in **nonaq**  
. **electrolyte** solns. for secondary lithium **batteries**  
)

L47 ANSWER 4 OF 6 HCA COPYRIGHT 2003 ACS on STN

136:281940 **Nonaqueous electrolyte** secondary

**battery**. Sekino, Masahiro; Satoh, Asako; Fujiwara, Masashi;  
Hasebe, Hiroaki (Kabushiki Kaisha Toshiba, Japan). Eur. Pat. Appl. EP  
1193788 A2 (20020403), 33 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK,  
ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO.  
(English). CODEN: EPXXDW. APPLICATION: EP 2001-308138 20010925.

PRIORITY: JP 2000-296074 20000928.

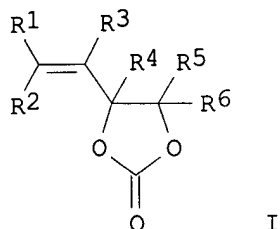
- AB Disclosed is a **nonaq. electrolyte secondary battery**, characterized by comprising a **nonaq. electrolyte** contg. ethylene carbonate and .gamma.-butyrolactone, wherein, when a charge-discharge cycle test satisfying conditions (A) to (D) given below is performed under an environment of 45.degree., the capacity retention rate at 100-th charge-discharge cycle is at least 85% based on the discharge capacity in the first charge-discharge cycle, (A) for the charging, the const. current-const. voltage charging to 4.2 V is performed for 3 h under a current of 1 C, (B) the discharging is performed to 3 V under a current of 1 C, (C) after the charging, the secondary **battery** is left to stand for 10 min, followed by performing the discharging, and (D) after the discharging, the secondary **battery** is left to stand for 10 min, followed by performing the charging.
- IC ICM H01M010-40  
ICS H01M010-44
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST **battery secondary nonaq electrolyte**
- IT **Carbon fibers, uses**  
RL: DEV (Device component use); USES (Uses)  
(mesophase pitch-based; **nonaq. electrolyte secondary battery**)
- IT **Battery electrolytes**  
Secondary **batteries**  
(**nonaq. electrolyte secondary battery**)
- IT Carbonaceous materials (technological products)  
RL: DEV (Device component use); USES (Uses)  
(**nonaq. electrolyte secondary battery**)
- IT **Carbon black, uses**  
Fluoropolymers, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(**nonaq. electrolyte secondary battery**)
- IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 110-00-9, Furan 110-02-1, Thiophene 534-22-5, 2-Methylfuran 2171-74-6, PyroCatechol carbonate 3741-38-6, Ethylene sulfite 4427-92-3, Phenylethylene carbonate **4427-96-7, Vinylethylene carbonate** 7791-03-9, Lithium perchlorate 9002-88-4, Polyethylene 14283-07-9, Lithium tetrafluoroborate 21324-40-3, **Lithium hexafluorophosphate** 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 90076-65-6 111706-40-2, Cobalt lithium oxide CoLiO-102 132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(**nonaq. electrolyte secondary battery**)
- IT **7782-42-5, Graphite, uses** 24937-79-9, PvdF  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(**nonaq. electrolyte secondary battery**)
- IT **4427-96-7, Vinylethylene carbonate**  
RL: DEV (Device component use); USES (Uses)  
(**nonaq. electrolyte secondary battery**)
- IT **7782-42-5, Graphite, uses**  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(**nonaq. electrolyte secondary battery**)

L47 ANSWER 5 OF 6 HCA COPYRIGHT 2003 ACS on STN

136:121099 secondary **nonaqueous electrolyte battery**. Kotado, Minoru; Kondo, Sumiko; Suzuki, Hirofumi; Suzuki, Hitoshi (Mitsubishi Chemical Corp., Japan). Jpn. Kokai Tokkyo Koho JP

2002025616 A2 20020125, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION:  
JP 2000-209291 20000711.

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- AB The **battery** uses an electrolyte soln. contg. I (R1-3 = H or C1-4 alkyl groups, R4-6 = H, C1-4 alkyl, or C2-7 alkenyl groups) and use a current .gtoreq.0.5C at least during part of the initial charging. Preferably, the **battery** uses a Li intercalating carbonaceous material for **anode**.
- IC ICM H01M010-40  
ICS H01M004-02; H01M004-58
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST secondary lithium **battery** electrolyte soln **vinylethylene carbonate** deriv
- IT **Battery** electrolytes  
(electrolyte solns. contg. **vinylethylene carbonate** derivs. for secondary lithium **batteries**)
- IT Secondary **batteries**  
(lithium; controlled initial charge current in manuf. of secondary lithium **batteries** contg. **vinylethylene carbonate** derivs.)
- IT 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 21324-40-3, **Lithium hexafluorophosphate**  
RL: DEV (Device component use); USES (Uses)  
(electrolyte solns. contg. **vinylethylene carbonate** derivs. for secondary lithium **batteries**)
- IT **4427-96-7, Vinylethylene carbonate**  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte solns. contg. **vinylethylene carbonate** derivs. for secondary lithium **batteries**)
- IT **4427-96-7, Vinylethylene carbonate**  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte solns. contg. **vinylethylene carbonate** derivs. for secondary lithium **batteries**)
- L47 ANSWER 6 OF 6 HCA COPYRIGHT 2003 ACS on STN
- 136:121064 **Nonaqueous electrolyte** lithium secondary **battery**. Iwamoto, Kazuyu; Oura, Takafumi; Hatazaki, Makino; Yoshizawa, Hiroshi; Sonoda, Kumiko; Nakanishi, Shinji (Matsushita Electric Industrial Co., Ltd., Japan). Eur. Pat. Appl. EP 1174940 A1 20020123, 31 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-117048 20010712. PRIORITY: JP 2000-215518 20000717; JP 2000-215519 20000717; JP 2000-215520 20000717.
- AB The invention relates to a nonaq. electrochem. app. in which the difference (.gamma.l-.gamma.se) between the surface tension .gamma.l of **nonaq. electrolyte** and the surface free energy .gamma.se of **electrode** is not more than 10 dynes/cm. The **nonaq.**

- electrolyte** contains a F-contg. surface active agent.
- IC ICM H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST **nonaq electrolyte** lithium secondary **battery**
- IT Carboxylic acids, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (C2-20, fluoroalkyl; **nonaq. electrolyte** lithium secondary **battery**)
- IT Sulfonic acids, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (alkanesulfonic, sodium salts, fluoro-; **nonaq. electrolyte** lithium secondary **battery**)
- IT Anhydrides  
 Ethers, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (cyclic; **nonaq. electrolyte** lithium secondary **battery**)
- IT Carboxylic acids, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (esters, cyclic; **nonaq. electrolyte** lithium secondary **battery**)
- IT Secondary **batteries**  
 (lithium; **nonaq. electrolyte** lithium secondary **battery**)
- IT **Battery electrodes**  
**Battery electrolytes**  
 Surface free energy  
 Surface tension  
 Surfactants  
 (**nonaq. electrolyte** lithium secondary **battery**)
- IT Carbonaceous materials (technological products)  
 RL: DEV (Device component use); USES (Uses)  
 (**nonaq. electrolyte** lithium secondary **battery**)
- IT Cyclic compounds  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**nonaq. electrolyte** lithium secondary **battery**)
- IT Lactones  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**nonaq. electrolyte** lithium secondary **battery**)
- IT Fluoropolymers, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (**nonaq. electrolyte** lithium secondary **battery**)
- IT 463-79-6D, Carbonic acid, esters 1343-98-2D, Silicic acid, esters  
 7664-38-2D, Phosphoric acid, esters 7664-93-9D, Sulfuric acid, esters  
 7697-37-2D, Nitric acid, esters 7782-77-6D, Nitrous acid, esters  
 7782-99-2D, Sulfurous acid, esters 10043-35-3D, Boric acid, esters  
 13598-36-2D, Phosphorous acid, esters  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (cyclic; **nonaq. electrolyte** lithium secondary **battery**)
- IT 79-20-9, Methyl acetate 85-44-9, Phthalic anhydride 96-48-0,  
 .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 105-54-4, Ethyl  
 butyrate 105-58-8, Diethyl carbonate 108-29-2, .gamma.-Valerolactone  
 108-30-5, Succinic anhydride, uses 108-32-7, Propylene carbonate  
 109-60-4, n-Propyl acetate 123-86-4, Butyl acetate 140-11-4, Benzyl

acetate 141-78-6, Ethyl acetate, uses 517-23-7, .alpha.-Acetyl-.gamma.-butyrolactone 540-42-1, Isobutyl propionate 554-12-1, Methyl propionate 616-02-4, Citraconic anhydride 616-38-6, Dimethyl carbonate 623-53-0, Ethylmethyl carbonate 1679-47-6, .alpha.-Methyl-.gamma.-butyrolactone 2170-03-8, Itaconic anhydride 2453-03-4, 1,3-Dioxan-2-one 7782-42-5, Graphite, uses 9002-88-4, Polyethylene 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 52627-24-4, Cobalt lithium oxide 52876-41-2, Trimethylene borate 90076-65-6 132843-44-8 201416-30-0, 4,5-Diphenyl-1,3,2-dioxathiole-2,2-dioxide 389604-01-7

RL: DEV (Device component use); USES (Uses)

(nonaq. electrolyte lithium secondary battery)

IT 77-79-2, Sulfolene 102-09-0, Diphenyl carbonate 126-33-0, Sulfolane 463-79-6D, Carbonic acid, ester 822-38-8, Ethylene trithiocarbonate 872-36-6, Vinylene carbonate 872-93-5, 3-MethylSulfolane 930-35-8, Vinylene trithiocarbonate 1120-71-4, Propanesultone 1600-44-8 1633-83-6, 1,4-Butanesultone 2171-74-6, 1,3-Benzodioxol-2-one 2965-52-8 3741-38-6, Ethylene sulfite 3967-54-2, Chloroethylene carbonate 4236-15-1 4427-92-3, Phenylethylene carbonate 4427-96-7, Vinylethylene carbonate 6255-58-9 7440-44-0, Carbon, uses 7704-34-9D, Sulfur, ester 16761-08-3 21240-34-6 37228-47-0, Ethylene phosphite 40630-61-3 52550-45-5 75032-95-0, Disodium N-perfluorooctanesulfonylglutamate 75046-16-1 122036-85-5 324547-56-0 366787-88-4

RL: MOA (Modifier or additive use); USES (Uses)

(nonaq. electrolyte lithium secondary battery)

IT 24937-79-9, PvdF

RL: TEM (Technical or engineered material use); USES (Uses)

(nonaq. electrolyte lithium secondary battery)

IT 7782-42-5, Graphite, uses

RL: DEV (Device component use); USES (Uses)

(nonaq. electrolyte lithium secondary battery)

IT 4427-96-7, Vinylethylene carbonate

RL: MOA (Modifier or additive use); USES (Uses)

(nonaq. electrolyte lithium secondary battery)

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L46 ANSWER 1 OF 10 HCA COPYRIGHT 2003 ACS on STN

139:233020 Nonaqueous electrolyte secondary

battery having excellent charging-discharging cycle at low temperature and long service life at high temperature.. Wada, Hiroshi (Japan Storage Battery Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003257478 A2(20030912, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-53455 20020228.

AB The title nonaq. electrolyte secondary battery

uses  $\text{Li}_x\text{Mn}_y\text{M}_z\text{O}_4$  ( $1.05 < x < 1.2$ ,  $1.8 < y < 1.95$ ,  $0 < z < 0.15$ , M = Al and/or Mg) as cathode active material and an electrolyte contg. cyclic carboxylic ester, vinylene carbonate and/or vinyl ethylene carbonate,  $\text{LiBF}_4$  and optionally  $\text{LiPF}_6$ .

IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)



- ST **nonaq electrolyte secondary battery**  
electrolyte **cathode** active material
- IT Carboxylic acids, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(esters, cyclic, **electrolyte** contg.; **nonaq. electrolyte secondary battery** having excellent charging-discharging cycle at low temp. and long service life at high temp.)
- IT Secondary batteries  
(**nonaq. electrolyte secondary battery** having excellent charging-discharging cycle at low temp. and long service life at high temp.)
- IT 155472-68-7, Lithium manganese oxide (Li1.1Mn1.9O4) 362666-83-9, Aluminum lithium manganese oxide (Al0.1Li1.1Mn1.8O4)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**cathode** active material; **nonaq. electrolyte secondary battery** having excellent charging-discharging cycle at low temp. and long service life at high temp.)
- IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate 872-36-6, Vinylene carbonate **4427-96-7**, **Vinyl ethylene carbonate** 14283-07-9 21324-40-3, Lithium hexafluorophosphate (LiPF6)  
)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**electrolyte** contg.; **nonaq. electrolyte secondary battery** having excellent charging-discharging cycle at low temp. and long service life at high temp.)
- IT **4427-96-7, Vinyl ethylene carbonate**  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**electrolyte** contg.; **nonaq. electrolyte secondary battery** having excellent charging-discharging cycle at low temp. and long service life at high temp.)

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L46 ANSWER 2 OF 10 HCA COPYRIGHT 2003 ACS on STN

139:233019 **Nonaqueous electrolyte secondary battery** having improved initial charge-discharge efficiency, cycle efficiency and low temperature characteristic. Takahashi, Kentaro (Sanyo Electric Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003257477 A2 20030912, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-51843 20020227.

AB The title **nonaq. electrolyte secondary battery** has Li ion-occluding and releasing **cathode**, Li ion-occluding and releasing **anode** and a **nonaq. electrolyte** contg. **electrolyte** salt and **nonaq. solvent**, wherein the **nonaq. solvent** comprises ethylene carbonate and propylene carbonate and/or butylene carbonate with ethylene carbonate/propylene carbonate and/or butylene carbonate mass ratio of 0.75-6.0, and at least one **vinyl ethylene carbonate** deriv. is added to the **nonaq. electrolyte**.

IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **nonaq electrolyte secondary battery** ethylene carbonate vinyl ethylene carbonate

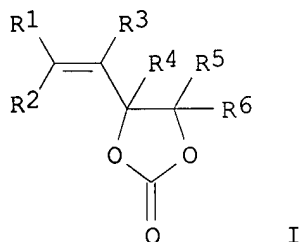
IT Secondary batteries  
(**nonaq. electrolyte; nonaq. electrolyte secondary battery** having improved initial

- charge-discharge efficiency, cycle efficiency and low temp. characteristic)
- IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 872-36-6, Vinylene carbonate **4427-96-7**, Vinyl ethylene carbonate 21324-40-3, Lithium hexafluorophosphate (LiPF<sub>6</sub>)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**nonaq. electrolyte** contg.; **nonaq. electrolyte** secondary **battery** having improved initial charge-discharge efficiency, cycle efficiency and low temp. characteristic)
- IT 623-53-0, Ethyl methyl carbonate 4437-85-8, Butylene carbonate  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**nonaq. electrolyte** secondary **battery** having improved initial charge-discharge efficiency, cycle efficiency and low temp. characteristic)
- IT **4427-96-7, Vinyl ethylene carbonate**  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**nonaq. electrolyte** contg.; **nonaq. electrolyte** secondary **battery** having improved initial charge-discharge efficiency, cycle efficiency and low temp. characteristic)
- L46 ANSWER 3 OF 10 HCA COPYRIGHT 2003 ACS on STN  
138:341110 **Nonaqueous electrolyte** solution and secondary **nonaqueous electrolyte battery**. Sekino, Masahiro; Sato, Asako; Momma, Jun; Oguchi, Masayuki (Kabushiki Kaisha Toshiba, Japan). PCT Int. Appl. WO 2003036752 A1 20030501, 80 pp. DESIGNATED STATES: W: CN, KR, US; RW: DE, FR, GB. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2002-JP11160 20021028. PRIORITY: JP 2001-329950 20011026.
- AB The electrolyte soln. has an electrolyte dissolved in a **nonaq.** solvent mixt., where the solvent mixt. comprises ethylene carbonate (EC), propylene carbonate (PC), .gamma.-butyrolactone (GBL), optional vinylene carbonate (VC) and a fifth component excluding EC PC GBL and VC, and satisfying  $x = 15-50$ ,  $y = 30-75$ ,  $0 < z < 30$ ,  $0 < w$ ,  $0 < q$ ,  $0 < w + q < 5$ , and  $0 < q$ . (x, y, z, w and q represent resp. proportions (vol. %) of EC, PC, GBL, VC and the fifth component relative to the total vol. of the solvent mixt.). The **battery** has an **electrode** group contg. the above electrolyte soln. in a **battery** case.
- IC ICM H01M010-40  
ICS H01M004-02; H01M004-58
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST secondary **battery electrolyte nonaq** solvent mixt content control
- IT **Battery** electrolytes  
Secondary **batteries**  
(Li salt electrolyte solns. contg. mixts. of various **nonaq.** solvents with controlled vol. % for secondary **batteries**)
- IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 872-36-6, Vinylene carbonate 4427-92-3, Phenyl ethylene carbonate **4427-96-7**, Vinyl ethylene carbonate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(Li salt electrolyte solns. contg. mixts. of various **nonaq.** solvents with controlled vol. % for secondary **batteries**)
- IT **7782-42-5, Graphite**, uses  
RL: DEV (Device component use); USES (Uses)

- (**anode**; Li salt electrolyte solns. contg. mixts. of various nonaq. solvents with controlled vol. % for secondary **batteries**)
- IT 12190-79-3D, Cobalt lithium oxide (CoLiO<sub>2</sub>), Li deficient  
RL: DEV (Device component use); USES (Uses)  
(**cathode**; Li salt electrolyte solns. contg. mixts. of various nonaq. solvents with controlled vol. % for secondary **batteries**)
- IT **4427-96-7, Vinyl ethylene carbonate**  
RL: DEV (Device component use); USES (Uses)  
(Li salt electrolyte solns. contg. mixts. of various nonaq. solvents with controlled vol. % for secondary **batteries**)
- IT **7782-42-5, Graphite, uses**  
RL: DEV (Device component use); USES (Uses)  
(**anode**; Li salt electrolyte solns. contg. mixts. of various nonaq. solvents with controlled vol. % for secondary **batteries**)
- L46 ANSWER 4 OF 10 HCA COPYRIGHT 2003 ACS on STN  
138:257874 **Nonaqueous electrolyte-electric battery**  
. Nakagawa, Hiroe; Inamasu, Tokuo (Yuasa Corporation, Japan). Jpn. Kokai Tokkyo Koho JP 2003086245 A2 20030320, 12 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-275843 20010912.
- AB The **battery** comprises a **nonaq. electrolyte** comprising a linear and a cyclic carbonate, where the cyclic carbonate contains a .pi. bond.
- IC ICM H01M010-40  
ICS H01M002-02; H01M004-58
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST **nonaq electrolyte carbonate lithium elec battery**
- IT **Electrodes**  
Electrolytes  
Safety  
Secondary **batteries**  
(structure and properties of **nonaq. electrolyte elec. battery**)
- IT Carbonates, uses  
Fluorides, uses  
RL: DEV (Device component use); USES (Uses)  
(structure and properties of **nonaq. electrolyte elec. battery**)
- IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 872-36-6, Vinylene carbonate 2171-74-6, 1,3-Benzodioxol-2-one **4427-96-7, Vinyl ethylene carbonate** 4437-85-8, Butylene carbonate 7429-90-5, Aluminum, uses 7439-93-2, Lithium, uses **7782-42-5, Graphite, uses** 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>) 16761-08-3 21240-34-6, 1,2-Diphenyl vinylene carbonate 21324-40-3, **Lithium hexafluorophosphate (LiPF<sub>6</sub>)** 156783-95-8 167951-80-6  
RL: DEV (Device component use); USES (Uses)  
(structure and properties of **nonaq. electrolyte elec. battery**)
- IT **4427-96-7, Vinyl ethylene carbonate**  
**7782-42-5, Graphite, uses**  
RL: DEV (Device component use); USES (Uses)  
(structure and properties of **nonaq. electrolyte elec. battery**)

138:76172 Nonaqueous secondary **battery**. Murai, Tetsuya; Mukai, Hiroshi (Japan Storage Battery Co., Ltd., Japan). Eur. Pat. Appl. EP 1276165 A1 20030115, 18 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK. (English). CODEN: EPXXDW. APPLICATION: EP 2002-15551 20020711. PRIORITY: JP 2001-211767 20010712; JP 2001-348541 20011114.

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AB A nonaq. **secondary cell** includes the following elements: a pos. **electrode** capable of absorbing and releasing lithium; a neg. **electrode** capable of absorbing and releasing lithium; and a **nonaq. electrolyte** including a **nonaq. solvent** and a lithium salt dissolved therein wherein the electrolyte contains a **vinyl ethylene carbonate** compd. represented by the general formula (I); wherein R1, R2, R3, R4, R5, and R6 represent each independently a hydrogen atom or an alkyl group having from 1 to 4 carbon atoms, and furthermore contains at least a compd. selected from the group consisting of vinylene carbonate, a cyclic sulfonic acid ester or a cyclic sulfuric acid ester, and an acid anhydride.

IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery nonaq electrolyte secondary**

IT Anhydrides

RL: MOA (Modifier or additive use); USES (Uses)  
(cyclic; **nonaq. electrolyte lithium secondary battery**)

IT Sulfonic acids, uses

RL: DEV (Device component use); USES (Uses)  
(esters, cyclic; **nonaq. electrolyte lithium secondary battery**)

IT Secondary **batteries**

(lithium; **nonaq. electrolyte lithium secondary battery**)

IT **Battery electrolytes**

(**nonaq. electrolyte lithium secondary battery**)

IT Carbonaceous materials (technological products)

RL: DEV (Device component use); USES (Uses)  
(**nonaq. electrolyte lithium secondary battery**)

IT Lactones

RL: MOA (Modifier or additive use); USES (Uses)  
(**nonaq. electrolyte lithium secondary battery**)

IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 105-58-8,

Diethyl carbonate 542-52-9, Dibutyl carbonate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, **Lithium hexafluorophosphate**

RL: DEV (Device component use); USES (Uses)

(**nonaq. electrolyte lithium secondary battery**)

IT 85-42-7, Cyclohexanedicarboxylic anhydride 85-43-8, 4-CyclohexEne-1,2-dicarboxylic acid anhydride 108-30-5, Succinic anhydride, uses 108-31-6, Maleic anhydride, uses 108-55-4, Glutaric anhydride 616-02-4, Citraconic anhydride 826-62-0, 5-Norbornene-2,3-dicarboxylic anhydride 872-36-6, Vinylene carbonate 1120-71-4, 1,3-Propanesultone 1131-15-3, Phenylsuccinic anhydride 1633-83-6, 1,4-Butanesultone 2426-02-0, 3,4,5,6-TETRAHYDROPHthalic ANHYDRIDE 2959-96-8, 2-Phenylglutaric anhydride 3289-23-4 **4427-96-7, Vinyl ethylene carbonate** 4480-83-5, Diglycolic anhydride 7664-93-9D, Sulfuric acid, ester, cyclic 478784-91-7, Ethylene glycol sulfate

RL: MOA (Modifier or additive use); USES (Uses)

(**nonaq. electrolyte lithium secondary battery**)

IT **4427-96-7, Vinyl ethylene carbonate**

RL: MOA (Modifier or additive use); USES (Uses)

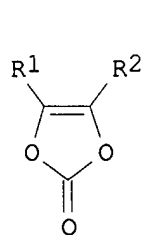
(**nonaq. electrolyte lithium secondary battery**)

L46 ANSWER 6 OF 10 HCA COPYRIGHT 2003 ACS on STN

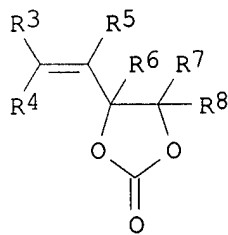
138:15257 Secondary **nonaqueous electrolyte battery**

. Kotado, Minoru; Fujii, Takashi; Kinoshita, Shinichi (Mitsubishi Chemical Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002352852 A2 (20021206, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-153396 20010523.

GI



I



II

AB The **battery** has a Li-intercalating **anode**, a **cathode**, and an electrolyte contg. a Li salt dissolved in a nonaq. solvent mixt.; where the solvent mixt. contains a vinylene carbonate deriv. I (R1-2 = H, C1-4 alkyl) and/or a **vinyl ethylene carbonate** deriv. II (R3-5 = H, C1-4; R6-8 = H, C1-4 alkyl or C2-7 alkenyl), and an acid anhydride.

IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary **battery** carbonate ester acid anhydride electrolyte solvent

IT **Battery** electrolytes

(compn. of Li salt electrolyte solns. contg. carbonate compd. mixts.)

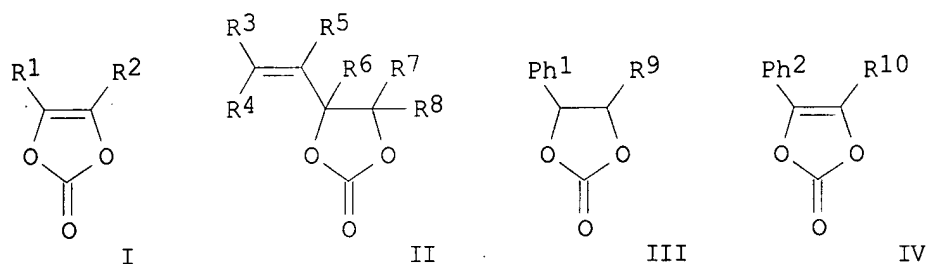
- and acid anhydrides for secondary lithium **batteries**)
- IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 108-30-5, Succinic anhydride, uses 108-32-7, Propylene carbonate 623-53-0, Ethyl methyl carbonate 4427-96-7, **Vinyl ethylene carbonate** 14283-07-9, Lithium tetrafluoroborate 21324-40-3, **Lithium hexafluorophosphate**  
 RL: DEV (Device component use); USES (Uses)  
 (compn. of Li salt electrolyte solns. contg. carbonate ester mixts. and acid anhydrides for secondary lithium **batteries**)
- IT 4427-96-7, **Vinyl ethylene carbonate**  
 RL: DEV (Device component use); USES (Uses)  
 (compn. of Li salt electrolyte solns. contg. carbonate ester mixts. and acid anhydrides for secondary lithium **batteries**)

L46 ANSWER 7 OF 10 HCA COPYRIGHT 2003 ACS on STN

138:15256 Secondary **nonaqueous electrolyte battery**

. Kotado, Minoru; Fujii, Takashi; Kinoshita, Shinichi (Mitsubishi Chemical Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002352851 A2 20021206, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-153395 20010523.

GI



- AB The **battery** has a Li-intercalating **anode**, a **cathode**, and an electrolyte contg. a Li salt dissolved in a nonaq. solvent mixt.; where the solvent mixt. contains a vinylene carbonate deriv., I (R1-2 = H, C1-4 alkyl) and/or a **vinyl ethylene carbonate** deriv. II (R3-5 = H, C1-4; R6-8 = H, C1-4 alkyl or C2-7 alkenyl), and a Ph group contg. cyclic carbonate deriv. selected from III and IV [Ph1-2 = (alkyl)phenyl; R9-10 = H, C1-4 alkyl, (alkyl)phenyl].
- IC ICM H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST secondary **battery** nonaq solvent carbonate ester mixt compn
- IT **Battery** electrolytes  
 (compn. of carbonate ester mixts. for lithium salt electrolytes in secondary lithium **batteries**)
- IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 623-53-0, Ethyl methyl carbonate 872-36-6, Vinylene carbonate 4427-92-3, Phenyl ethylene carbonate 4427-96-7, **Vinyl ethylene carbonate** 14283-07-9, Lithium tetrafluoroborate 21324-40-3, **Lithium hexafluorophosphate**  
 RL: DEV (Device component use); USES (Uses)  
 (compn. of carbonate ester mixts. for lithium salt electrolytes in secondary lithium **batteries**)
- IT 4427-96-7, **Vinyl ethylene carbonate**  
 RL: DEV (Device component use); USES (Uses)  
 (compn. of carbonate ester mixts. for lithium salt electrolytes in secondary lithium **batteries**)

L46 ANSWER 8 OF 10 HCA COPYRIGHT 2003 ACS on STN

137:372581 **Nonaqueous electrolyte** solution, composition

for polymer gel electrolyte, polymer gel electrolyte, secondary **battery**, and double layer capacitor. Sato, Takaya; Iida, Hiroki; Maruo, Tatsuya; Banno, Kimiyo (Nisshinbo Industries, Inc., Japan). PCT Int. Appl. WO 2002093679 A1 20021121, 60 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2002-JP3937 20020419. PRIORITY: JP 2001-140492 20010510.

AB The electrolyte soln. contains a compd. having a redox potential .gtoreq.1.0 V vs. Li/Li+. The electrolyte soln. contains an ion conductive salt, an org. solvent, and 0.01-7% of the above described compd. selected from maleic anhydride, N-Me maleimide, N-vinylpyrrolidone, tetrahydrofurfuryl (meth)acrylate, vinyl oxazoline, propane sultone, butane sultone, vinylene carbonate, N-vinyl caprolactam, 2-vinyl-1,3-dioxolane, **vinylethylene carbonate**, ethylene sulfide, their derivs., butadiene sulfone, and fluoroethylene carbonate. The polymer gel electrolyte is a gelled compn. contg. the electrolyte soln. and a compd., other than those mentioned above, having .gtoreq. reactive double bonds. The **battery** and capacitor use the above electrolyte.

IC ICM H01M010-40

ICS H01G009-038; H01G009-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery** polymer gel electrolyte additive redox potential;  
capacitor polymer gel electrolyte additive redox potential

IT Capacitors

(double layer; **nonaq. electrolyte** solns. and  
polymer gel electrolytes for secondary lithium **batteries** and  
double layer capacitors)

IT **Battery electrolytes**

(**nonaq. electrolyte** solns. and polymer gel  
electrolytes for secondary lithium **batteries** and double layer  
capacitors)

IT Polyurethanes, uses

RL: DEV (Device component use); USES (Uses)

(**nonaq. electrolyte** solns. and polymer gel  
electrolytes for secondary lithium **batteries** and double layer  
capacitors)

IT 88-12-0, uses 108-31-6, Maleic anhydride, uses 420-12-2, Ethylene  
sulfide 872-36-6, Vinylene carbonate 930-88-1, N-Methyl maleimide  
1120-71-4, Propanesultone 1633-83-6, Butanesultone 2235-00-9,  
N-Vinylcaprolactam 2455-24-5, Tetrahydrofurfuryl methacrylate  
3984-22-3, 2-Vinyl-1,3-dioxolane 28452-93-9, Butadienesulfone  
114435-02-8 128220-92-8

RL: DEV (Device component use); PRP (Properties); USES (Uses)

(electrolyte additives with controlled redox potential for secondary  
lithium **batteries** and double layer capacitors)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7,  
Propylene carbonate 3290-92-4D, Trimethylolpropane trimethacrylate,  
polymer with Polyethylene glycol dimethacrylate-polyethylene glycol mono  
methacrylate Me ether-poly(vinyl alc.) cyanoethylate 9002-89-5D,  
Poly(vinyl alcohol), cyanoethylated 9002-89-5D, Poly(vinyl alcohol),

cyanoethylated, polymer with Polyethylene glycol dimethacrylate-polyethylene glycol mono methacrylate Me ether-trimethylolpropane trimethacrylate copolymer 21324-40-3, **Lithium hexafluorophosphate** 25852-47-5D, Polyethylene glycol dimethacrylate, polymer with polyethylene glycol mono methacrylate Me ether-poly(vinyl alc.) cyanoethylate-trimethylolpropane trimethacrylate copolymer 26915-72-0D, Polyethylene glycol mono methacrylate methyl ether, polymer with Polyethylene glycol dimethacrylate-poly(vinyl alc.) cyanoethylate-trimethylolpropane trimethacrylate copolymer 475572-92-0  
RL: DEV (Device component use); USES (Uses)  
(**nonaq. electrolyte** solns. and polymer gel electrolytes for secondary lithium **batteries** and double layer capacitors)

L46 ANSWER 9 OF 10 HCA COPYRIGHT 2003 ACS on STN

137:372580 Method for injecting **nonaqueous** polymer gel

**electrolyte** solution. Sato, Takaya; Iida, Hiroki; Maruo, Tatsuya; Banno, Kimiyo (Nissinbo Industries, Inc., Japan). PCT Int. Appl. WO 2002093678 A1 20021121, 42 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2002-JP3936 20020419. PRIORITY: JP 2001-140569 20010510.

AB **Electrodes** and separators, in **batteries** and double layer capacitors, are impregnated with a polymer gel electrolyte, by injecting an electrolyte soln. contg. a pregel compn. having viscosity .ltoreq.100 cP at 20.degree.. The **batteries** and capacitors are heated to .gtoreq.40.degree. before the injection. Preferably, the electrolyte soln. contains an ion conductive salt, an org. electrolyte soln., and 0./01-7% of a compd. selected from maleic anhydride, N-Me maleimide, N-vinylpyrrolidone, tetrahydrofurfuryl (meth)acrylate, vinylloxazoline, propanesultone, butanesultone, vinylene carbonate, N-vinylcaprolactone, 2-vinyl-1,3-dioxazoline, **vinylethylene carbonate**, butadienesulfone, ethylene sulfide, their derivs., and fluoroethylene carbonate.

IC ICM H01M010-40

ICS H01M002-36; H01G009-038

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery electrode** separator polymer gel electrolyte injection; capacitor **electrode** separator polymer gel electrolyte injection

IT Carbonaceous materials (technological products)  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
(comps. and method for injecting **nonaq.** polymer gel **electrolyte** solns. in **batteries** and double layer capacitors)

IT **Battery** electrolytes  
(comps. and method for injecting **nonaq.** polymer gel **electrolyte** solns. in secondary lithium **batteries**)

IT Capacitors  
(double layer; comps. and method for injecting **nonaq.** polymer gel **electrolyte** solns. in double layer capacitors)

IT 88-12-0, uses 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-31-6, Maleic anhydride, uses 108-32-7, Propylene carbonate



420-12-2, Ethylene sulfide 872-36-6, Vinylene carbonate 930-88-1,  
N-Methyl maleimide 1120-71-4, Propanesultone 2455-24-5,  
Tetrahydrofurfuryl methacrylate 12190-79-3, Cobalt lithium oxide  
(CoLiO<sub>2</sub>) 13670-33-2 21324-40-3, **Lithium**  
**hexafluorophosphate** 183301-46-4

RL: DEV (Device component use); PEP (Physical, engineering or chemical  
process); PYP (Physical process); PROC (Process); USES (Uses)

(compns. and method for injecting **nonaq.** polymer gel

**electrolyte** solns. in **batteries** and double layer  
capacitors)

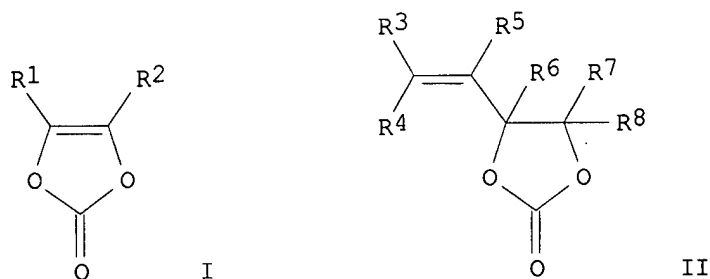
- IT 3290-92-4D, Trimethylolpropane trimethacrylate, polymer with  
cyanoethylated poly(vinyl alc.), poly(ethylene glycol) dimethacrylate, and  
poly(ethylene glycol) methacrylate Me ether 9002-89-5D, Poly(vinyl  
alcohol), cyanoethylated, polymer with poly(ethylene glycol)  
dimethacrylate, poly(ethylene glycol) methacrylate Me ether, and  
trimethylolpropane trimethacrylate 25852-47-5D, Poly(ethylene glycol)  
dimethacrylate, polymer with cyanoethylated poly(vinyl alc.),  
poly(ethylene glycol) methacrylate Me ether, and trimethylolpropane  
trimethacrylate 26915-72-0D, Poly(ethylene glycol) methacrylate methyl  
ether, polymer with cyanoethylated poly(vinyl alc.), poly(ethylene glycol)  
dimethacrylate, and trimethylolpropane trimethacrylate  
RL: DEV (Device component use); PEP (Physical, engineering or chemical  
process); PYP (Physical process); PROC (Process); USES (Uses)  
(pregel; compns. and method for injecting **nonaq.** polymer gel  
**electrolyte** solns. in **batteries** and double layer  
capacitors)

L46 ANSWER 10 OF 10 HCA COPYRIGHT 2003 ACS on STN

137:355411 Secondary **nonaqueous electrolyte**

**battery**. Kotada, Minoru; Sato, Shuji; Fujii, Takashi; Suzuki,  
Hitoshi (Mitsubishi Chemical Corp., Japan). Jpn. Kokai Tokkyo Koho JP  
2002324580 A2 (2002)1108, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION:  
JP 2002-38703 20020215. PRIORITY: JP 2001-48065 20010223.

GI



- AB The **battery** is a secondary Li **battery** using an  
**anode** active mass, contg. 80-99% of a carbonaceous core material  
having d002 0.335-0.338 nm carbonaceous and 1-20% of a carbonaceous  
material having a larger d002 adhered on the core material, and an  
electrolyte soln. contg. vinylene carbonate deriv. I (R<sup>1</sup> and R<sup>2</sup> = H or  
C1-4 alkyl groups) and/or **vinylethylene carbonate** II  
(R<sup>3-5</sup> = H or C1-4kyl group, R<sup>6-8</sup> = H, C1-4 alkyl, or C2-7 alkenyl groups).
- IC ICM H01M010-40  
ICS H01M004-02; H01M004-58
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST secondary lithium **battery anode** carbonaceous material;

electrolyte soln vinylene carbonate deriv lithium **battery**;  
**vinylethylene carbonate** deriv lithium **battery**  
electrolyte soln

IT **Battery anodes**

(**anodes** from carbonaceous material contg. core and surface  
layer of different interplanar spacings for secondary lithium  
**batteries**)

## IT Carbonaceous materials (technological products)

RL: DEV (Device component use); PRP (Properties); USES (Uses)

(**anodes** from carbonaceous material contg. core and surface  
layer of different interplanar spacings for secondary lithium  
**batteries**)

IT **Battery electrolytes**

(electrolyte solns. contg. vinylene carbonate derivs. and  
**vinylethylene carbonate** derivs. for secondary lithium  
**batteries**)

IT **Secondary batteries**

(lithium; secondary lithium **batteries** with electrolyte solns.  
contg. vinylene carbonate derivs. and **vinylethylene**  
**carbonate** derivs. and carbonaceous **anodes**)

IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 108-32-7,  
Propylene carbonate 623-53-0, Ethyl methyl carbonate 872-36-6,  
Vinylene carbonate **4427-96-7, Vinylethylene**  
**carbonate** 14283-07-9, Lithium fluoroborate 21324-40-3,  
**Lithium hexafluorophosphate**

RL: DEV (Device component use); USES (Uses)

(electrolyte solns. contg. vinylene carbonate derivs. and  
**vinylethylene carbonate** derivs. for secondary lithium  
**batteries**)

IT **4427-96-7, Vinylethylene carbonate**

RL: DEV (Device component use); USES (Uses)

(electrolyte solns. contg. vinylene carbonate derivs. and  
**vinylethylene carbonate** derivs. for secondary lithium  
**batteries**)

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L84 ANSWER 1 OF 3 JAPIO (C) 2003 JPO on STN

ACCESSION NUMBER: 2002-343430 JAPIO

TITLE: **NONAQUEOUS ELECTROLYTE SECONDARY**  
**BATTERY**

INVENTOR: KOTADO MINORU; SUZUKI HITOSHI; YAMAMOTO TAKAHIRO;  
YAJIMA TORU

PATENT ASSIGNEE(S): MITSUBISHI CHEMICALS CORP  
AT BATTERY:KK

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2002343430	A	20021129	Heisei	H01M010-40

## APPLICATION INFORMATION

STN FORMAT: JP 2001-152234 20010522  
ORIGINAL: JP2001152234 Heisei  
PRIORITY APPLN. INFO.: JP 2001-152234 20010522  
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined  
Applications, Vol. 2002

AN 2002-343430 JAPIO

AB PROBLEM TO BE SOLVED: To provide a **nonaqueous** electrolyte secondary **battery**, of improved in large current discharging characteristics and charging/discharging cycle characteristics, with deformation of the exterior jacketing material, when stored at high temperature suppressed.  
SOLUTION: In the **nonaqueous** electrolyte secondary **battery** provided with an **electrode** group and a **nonaqueous** electrolyte, (1) the **electrode** group is accommodated in the sheet-made exterior jacketing material of 0.5 mm or less in thickness including a **resin** layer, (2) an **nonaqueous** solvent of the **nonaqueous** electrolyte contains  $\gamma$ -butyrolactone, ethylene carbonate, at least one kind of vinylene carbonate compound, and at least one kind of **vinyl ethylene carbonate** compound, (3) the vinylene carbonate compound, the **vinyl ethylene carbonate** compound, and the total amount of these compounds is 0.01-5 wt.%, 0.01-5 wt.%, and 0.02-6 wt.%, respectively, based on the total weight of the **nonaqueous** solvent, and (4) the  $\gamma$ -butyrolactone and the ethylene carbonate are  $\geq 50$  vol.% and  $\geq 10$  vol.%, respectively, with respect to the total volume of the **nonaqueous** solvent.  
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IC ICM H01M010-40  
ICS H01M002-02

L84 ANSWER 2 OF 3. JAPIO (C) 2003 JPO on STN

ACCESSION NUMBER: 1987-022376 JAPIO  
TITLE: THIN LITHIUM **BATTERY**  
INVENTOR: NAGAI TATSU; MATSUMOTO KAZUNOBU; KITAGAWA SATOSHI;  
KAJITA KOZO; MANABE TOSHIKATSU  
PATENT ASSIGNEE(S): HITACHI MAXELL LTD  
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 62022376	A	19870130	Showa	H01M010-40

## APPLICATION INFORMATION

STN FORMAT: JP 1985-162255 19850722  
ORIGINAL: JP60162255 Showa  
PRIORITY APPLN. INFO.: JP 1985-162255 19850722  
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined  
Applications, Vol. 1987

AN 1987-022376 JAPIO

AB PURPOSE: To prevent any liquid leakage from a thin lithium **battery** so as to increase its reliability by sufficiently sealing the **battery** by using an electrolyte which is composed of a lithium salt, a **polymer** containing a **lactone** structure and a **nonaqueous** solvent.  
CONSTITUTION: After a dimethoxyethane addition product of  $\text{LiB\&phiv}<\text{SB}>4</\text{SB}>$  is dissolved in propylene carbonate, poly(3-vinyl-1,4-butyrolactone) is mixed into the solution to seal this compound in the solution and then the resulting mixture is heated to

prepare a homogeneous viscous electrolyte. Next, a mixture consisting of this electrolyte and TiS powder in a ratio by volume of 30:70 is kneaded and then the kneaded mixture is applied to the entire surface of a positive current collector plate to make a positive **electrode**. Next, a separator consisting of a porous polypropylene is formed on the positive **electrode** and a negative **electrode** made of a lithium-aluminum alloy is placed on the separator. After that, a negative current collector plate is placed over the negative **electrode** and then fused to it, thereby producing a thin lithium **battery** with a total thickness of 0.5mm.

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IC ICM H01M010-40

L84 ANSWER 3 OF 3 JAPIO (C) 2003 JPO on STN

ACCESSION NUMBER: 1987-022375 JAPIO

TITLE: THIN LITHIUM **BATTERY**

INVENTOR: NAGAI TATSU; MATSUMOTO KAZUNOBU; KITAGAWA SATOSHI;  
KAJITA KOZO; MANABE TOSHIKATSU

PATENT ASSIGNEE(S): HITACHI MAXELL LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 62022375	A	19870130	Showa	H01M010-40

APPLICATION INFORMATION

STN FORMAT: JP 1985-162254 19850722

ORIGINAL: JP60162254 Showa

PRIORITY APPLN. INFO.: JP 1985-162254 19850722

SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1987

AN 1987-022375 JAPIO

AB PURPOSE: To prevent any liquid leakage from a thin lithium **battery** so as to increase its reliability by sufficiently sealing the **battery** by using an electrolyte which is composed of a lithium salt, a **polymer** containing a cyclic carbonate ester structure and a **nonaqueous** solvent.

CONSTITUTION: After a dimethoxyethane addition product of  $\text{LiB\&\phi;iv};\text{<SB>4</SB>}$  is dissolved in propylene carbonate, poly(1-vinyl-1,2-propanediol cyclic carbonate) is mixed into the solution to seal this compound in the solution and then the resulting mixture is heated to prepare a homogeneous viscous electrolyte. Next, a mixture consisting of this electrolyte and  $\text{TiS<SB>2</SB>}$  powder in a ratio by volume of 30:70 is kneaded and then the kneaded and then the kneaded mixture is applied to the entire surface of a positive current collector plate to make a positive **electrode**. Next, a separator consisting of a porous polypropylene is formed on the positive **electrode** and a negative **electrode** made of a lithium-aluminum alloy is placed on the separator. After that, a negative current collector plate is placed over the negative **electrode** and the fused to it, thereby producing a thin lithium **battery** with a total thickness of 0.5mm.

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IC ICM H01M010-40

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<http://thomsonderwent.com/support/userguides/> <<<

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L85 ANSWER 1 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
AN 2003-570421 [54] WPIX  
DNN N2003-453403 DNC C2003-154236  
TI Electrodes, used in lithium **battery** or lithium-**polymer**  
**battery**, contain adhesion promoter, preferably based on polyvinyl  
pyrrolidone or **copolymer**, in active electrode compositions.  
DC A85 L03 X16  
IN KRUGER, F J; NAARMANN, H  
PA (DILO-N) DILO TRADING AG  
CYC 1  
PI DE 10107384 A1 20020905 (200354)\* 4p H01M004-04  
ADT DE 10107384 A1 DE 2001-10107384 20010214  
PRAI DE 2001-10107384 20010214  
IC ICM H01M004-04  
ICS H01M004-62  
AB DE 10107384 A UPAB: 20030821  
NOVELTY - Electroconductive adhesion promoter for electrodes used in  
lithium **batteries** and lithium-**polymer**  
**batteries**.  
USE - The electrodes are used in lithium **batteries** and  
lithium-**polymer batteries** (claimed).  
ADVANTAGE - Existing adhesion promoters are ineffective or not  
effective enough for bonding active anode compositions based on  
**carbon** capable of intercalation or cathode compositions based on  
transition metal oxides with intercalated lithium to copper or aluminum  
current collectors. The present special **polymers**, based on  
(co)polyvinyl pyrrolidone, solve this problem.  
Dwg.0/0  
FS CPI EPI

FA AB  
MC CPI: A04-D05A; A12-E06A; L03-E01B5B  
EPI: X16-E08A; X16-E09

L85 ANSWER 2 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-498765 [47] WPIX

DNN N2003-396595 DNC C2003-133517

TI Non-aqueous electrolyte liquid for lithium secondary **battery**, comprises lithium salt dissolved in non-aqueous solvent containing compound having 1,2,3-oxa diazolum-5-olate structure.

DC L03 X16

PA (MITU) MITSUBISHI CHEM CORP

CYC 1

PI JP 2003123839 A (20030425 (200347)\* 7p H01M010-40

ADT JP 2003123839 A JP 2001-318200 20011016

PRAI JP 2001-318200 20011016

IC ICM H01M010-40

ICS H01M004-02; H01M004-38; H01M004-48; H01M004-58

AB JP2003123839 A UPAB: 20030723

NOVELTY - A non-aqueous electrolyte liquid comprises a lithium salt dissolved in a non-aqueous solvent. The non-aqueous solvent contains a compound having a 1,2,3-oxa diazolum-5-olate structure.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for a lithium secondary **battery** comprising a non-aqueous electrolyte, an anode and a cathode.

USE - Used for a lithium secondary **battery** (claimed).

ADVANTAGE - The lithium secondary **battery** comprising the non-aqueous electrolyte has high charging and discharging properties and high energy density. The **battery** is safe even at high temperature.

Dwg.0/0

FS CPI EPI

FA AB

MC CPI: L03-E01C2

EPI: X16-B01F1; X16-J02; X16-J08

L85 ANSWER 3 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-498764 [47] WPIX

DNN N2003-396594 DNC C2003-133516

TI Non-aqueous electrolyte liquid for lithium secondary **batteries**, has non-aqueous solvent containing meso ionic compound except compound having 1,2,3-oxadiazolum-5-olate structure.

DC L03 X16

PA (MITU) MITSUBISHI CHEM CORP

CYC 1

PI JP 2003123838 A (20030425 (200347)\* 9p H01M010-40

ADT JP 2003123838 A JP 2001-318199 20011016

PRAI JP 2001-318199 20011016

IC ICM H01M010-40

ICS H01M004-02; H01M004-38; H01M004-48; H01M004-58

AB JP2003123838 A UPAB: 20030723

NOVELTY - A non-aqueous electrolyte liquid has a lithium salt dissolved in non-aqueous solvent containing a meso ionic compound except a compound having a 1,2,3-oxadiazolum-5-olate structure.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for lithium secondary **battery** comprising a non-aqueous electrolyte liquid, an anode which contains a material which can occlude and emit lithium, and a cathode which contains metal lithium, lithium alloy or a material which can occlude and emit lithium.

USE - Used for lithium secondary **batteries** (claimed).

ADVANTAGE - The lithium secondary **battery** using the non-aqueous electrolyte liquid has high energy density, good capacitance maintenance property, high charging and discharging efficiency and safety at large temperature range.

Dwg.0/0

FS CPI EPI

FA AB

MC CPI: L03-E01C2

EPI: X16-B01F1; X16-J02; X16-J08

L85 ANSWER 4 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-468328 [44] WPIX

DNN N2003-372740 DNC C2003-124901

TI Non-aqueous electrolyte for use for secondary **batteries** used in mobile phones, comprises a non-aqueous solvent with a dissolved electrolyte.

DC E19 L03 W01 X16

IN MOMMA, J; OGUCHI, M; SATO, A; SEKINO, M

PA (TOKE) TOSHIBA.KK

CYC 7

PI WO 2003036752 A1 20030501 (200344)\* JA 30p H01M010-40

RW: DE FR GB

W: CN KR US

JP 2003203675 A 20030718 (200351) 24p H01M010-40

ADT WO 2003036752 A1 WO 2002-JP11160 20021028; JP 2003203675 A JP 2002-313051 20021028

PRAI JP 2001-329950 20011026

IC ICM H01M010-40

ICS H01M004-02; H01M004-58

AB WO2003036752 A UPAB: 20030710

NOVELTY - A non-aqueous electrolyte comprising a non-aqueous solvent with a dissolved electrolyte, is new.

DETAILED DESCRIPTION - The non-aqueous solvent contains ethylenecarbonate (EC), propylene carbonate (PC), gamma -butyrolactone (GBL) and a fourth component other than EC, PC and GBL, in amounts which satisfy the following relationships (1), (2), (3) and (4):

15 at most x at most 50 (1);

30 at most y at most 75 (2);

0 less than z less than 30 (3);

0 at most w at most 5 (4);

x = vol% of EC ;

y = vol% of PC ;

z = vol% of GBL ;

p = vol% of the fourth component

USE - The non-aqueous electrolyte is for use for secondary **batteries** which are widely used for mobile devices such as mobile phones.

ADVANTAGE - Secondary **batteries** utilizing the non-aqueous electrolyte have an increase charge/discharge cycle lifetime at a high temperature.

Dwg.0/3

FS CPI EPI

FA AB; DCN

MC CPI: E07-A02C; E07-A04; L03-E01C2

EPI: W01-C01D3C; W01-C01E5B; X16-B01F; X16-J02; X16-J08

L85 ANSWER 5 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-441705 [41] WPIX

DNN N2003-352556 DNC C2003-117023

TI **Battery** has positive and negative electrodes and electrolyte

where capacitance of negative electrode contains capacitance which occludes and releases light metal and capacitance which precipitates and dissolves light metal.

DC E19 L03 X16

IN ADACHI, M; AKASHI, H; FUJITA, S

PA (SONY) SONY CORP

CYC 27

PI WO 2003041207 A1 20030515 (200341)\* JA 40p H01M010-40

RW: AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LU MC NL PT SE SK  
TR

W: CN KR US

JP 2003151627 A 20030523 (200343) 14p H01M010-40

ADT WO 2003041207 A1 WO 2002-JP11668 20021108; JP 2003151627 A JP. 2001-345222  
20011109

PRAI JP 2001-345222 20011109

IC ICM H01M010-40

ICS H01M004-02; H01M004-40; H01M004-58

AB WO2003041207 A UPAB: 20030630

NOVELTY - **Battery** has positive and negative electrodes and an electrolyte. The capacitance of the negative electrode contains a capacitance component which occludes and releases a light metal and a capacitance component which precipitates and dissolves the light metal, and is represented by the sum of these. The electrolyte contains greater than 1 cyclic compound.

DETAILED DESCRIPTION - **Battery** has positive and negative electrodes and an electrolyte. The capacitance of the negative electrode contains a capacitance component which occludes and releases a light metal and a capacitance component which precipitates and dissolves the light metal, and is represented by the sum of these. The electrolyte contains greater than one cyclic compound of formula (I) or (II).

U, V and W = at least 1 group 6B element;

R1 = unsaturated alkyl group;

X, Y and Z = at least 1 group 6B element; and

R2 - R3 = unsaturated alkyl group.

USE - Used as a **battery** for portable telephones, personal digital assistants, and computers etc.

ADVANTAGE - The **battery** has an improved chemical stability and shows improved discharging capacity and charging/discharging cycle characteristics.

DESCRIPTION OF DRAWING(S) - Figure 1 shows a secondary **battery**.

Electrode can 11

Insulation plate 12

Insulation plate 13

**Battery** cover 14

Safety valve 15

Disc plate 15a

Heat sensitive resistor element 16

Gasket 17

Wound electrode 20

Positive electrode 21

Negative electrode 22

Separator 23

Center pin 24

Positive electrode lead 25

Negative electrode lead 26

Dwg.1/2

FS CPI EPI

FA AB; GI; DCN

MC CPI: E05-A; E05-K; E07-H03; E10-A08C; E10-A10D; E31-K07; E33-G;



L03-E01B5B; L03-E01C2; L03-E01C4  
EPI: X16-B01F; X16-J08

L85 ANSWER 6 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
AN 2003-267967 [26] WPIX  
DNN N2003-213083 DNC C2003-069825  
TI Formation of electrolyte for non-aqueous **secondary cell**  
, comprises dissolving lithium salt in non-aqueous solvent based on  
lactone compound where amount of hydroxycarboxylic acid in electrolyte is  
low.  
DC E19 L03 X16  
IN FUJII, T; KINOSHITA, S; KOTATO, M; NODA, D; SUZUKI, H; TAKEHARA, M; UE, M  
PA (MITU) MITSUBISHI CHEM CORP  
CYC 101  
PI WO 2003007416 A1 20030123 (200326)\* JA 61p H01M010-40  
RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR IE IT KE LS LU  
MC MW MZ NL OA PT SD SE SK SL SZ TR TZ UG ZM ZW  
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS KE KG KP KR KZ  
LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO  
RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM ZW  
JP 2003092137 A 20030328 (200331) 21p H01M010-40  
EP 1317013 A1 20030604 (200337) EN H01M010-40  
R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LT LU LV MC  
MK NL PT RO SI  
US 2003165733 A1 20030904 (200359) H01M004-36  
ADT WO 2003007416 A1 WO 2002-JP6906 20020708; JP 2003092137 A JP 2002-200364  
20020709; EP 1317013 A1 EP 2002-745873 20020708, WO 2002-JP6906 20020708;  
US 2003165733 A1 Cont of WO 2002-JP6906 20020708, US 2003-383555 20030310  
FDT EP 1317013 A1 Based on WO 2003007416  
PRAI JP 2001-214638 20010716; JP 2001-208992 20010710  
IC ICM H01M004-36; H01M010-40  
ICS H01M004-02; H01M004-38; H01M004-40; H01M004-46; H01M004-48;  
H01M004-58; H01M006-00; H01M010-00  
AB WO2003007416 A UPAB: 20030428  
NOVELTY - Formation of electrolyte for a non-aqueous **secondary**  
**cell**, comprises dissolving a lithium salt in a non-aqueous solvent  
based on a lactone compound. The amount of hydroxycarboxylic acid in the  
electrolyte is less than 1 mmol/kg.  
DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a  
non-aqueous **electrolyte secondary cell**,  
which comprises:  
(1) a negative electrode containing metal lithium, lithium alloy or a  
material which can occlude and release lithium; and  
(2) a positive electrode including a material which can occlude and  
release lithium and an electrolyte formed by dissolving a lithium salt in  
a non-aqueous solvent based on a lactone compound in which the amount of  
hydroxycarboxylic acid in the electrolyte is less than 1 mmol/kg.  
USE - Used as an electrolyte used in the production of non-aqueous  
**secondary cells**.  
ADVANTAGE - The **electrolyte** and the **cell** have  
excellent retention of capacity at a high temperature, cycle  
characteristics, various cell characteristics over a wide temperature  
range, and safety such as ignition characteristics.  
Dwg.0/0  
FS CPI EPI  
FA AB; GI; DCN  
MC CPI: E05-A; E06-H; E07-A02C; E07-A04; E07-H03; E31-K07; E31-Q02; E33-G;  
L03-E01C2  
EPI: X16-B01F1; X16-E01C; X16-J02; X16-J08

L85 ANSWER 7 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
AN 2002-659151 [71] WPIX  
DNN N2002-520887 DNC C2002-185415

TI Electrodes used in lithium **battery** or lithium-**polymer battery** contain adhesion promoter, preferably based on polyisobutene and/or isoprene **copolymer**, in active electrode compositions.

DC A85 L03 X16

IN KRUGER, F J; NAARMANN, H

PA (DILO-N) DILO TRADING AG

CYC 1

PI DE 10115210 A1 20020912 (200271)\* 4p H01M004-62

ADT DE 10115210 A1 DE 2001-10115210 20010214

PRAI DE 2001-10115210 20010214

IC ICM H01M004-62

AB DE 10115210 A UPAB: 20021105

NOVELTY - Electroconductive adhesion promoter for electrodes.

USE - The electrodes are used in lithium **batteries** and lithium-**polymer batteries** (claimed).

ADVANTAGE - Existing adhesion promoters are ineffective or not effective enough for bonding active anode compositions based on **carbon** capable of intercalation or cathode compositions based on transition metal oxides with intercalated lithium to copper or aluminum current collectors. The present polyisobutene homo- and/or **copolymers**, which are free from functional groups and especially produced by cationic polymerization, solve this problem.

Dwg.0/0

FS CPI EPI

FA AB

MC CPI: A04-G05A; A12-E06A; L03-E01B; L03-E01C2

EPI: X16-E09; X16-J01; X16-J07

L85 ANSWER 8 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
AN 2002-658970 [71] WPIX  
DNN N2002-520720 DNC C2002-185375

TI Electrodes used in lithium **battery** or lithium-**polymer battery** contain adhesion promoter, preferably based on polyisobutene or isoprene **copolymer**, in active electrode compositions.

DC A85 L03 X16

IN KRUGER, F J; NAARMANN, H

PA (DILO-N) DILO TRADING AG

CYC 1

PI DE 10107423 A1 20020912 (200271)\* 4p H01M004-04

ADT DE 10107423 A1 DE 2001-10107423 20010214

PRAI DE 2001-10107423 20010214

IC ICM H01M004-04

ICS H01M004-62

AB DE 10107423 A UPAB: 20021105

NOVELTY - Electroconductive adhesion promoter for electrodes.

USE - The electrodes are used in lithium **batteries** and lithium-**polymer batteries** (claimed).

ADVANTAGE - Existing adhesion promoters are ineffective or not effective enough for bonding active anode compositions based on **carbon** capable of intercalation or cathode compositions based on transition metal oxides with intercalated lithium to copper or aluminum current collectors. The present special **polymers**, based on (co)polyvinylpyrrolidone, solve this problem.

Dwg.0/0

FS CPI EPI

FA AB

MC CPI: A04-G05A; A12-E06A; L03-E01B5

EPI: X16-A02A; X16-B01F1; X16-E09

L85 ANSWER 9 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2002-655585 [70] WPIX

CR 2002-385369 [42]

DNN N2002-518065 DNC C2002-184091

TI Non-aqueous electrolyte for secondary **battery** useful in, e.g. portable telephone, includes solvent containing specified amounts of ethylene carbonate and gamma-butyrolactone.

DC L03 W01 X16

IN FUJIWARA, M; HASEBE, H; SATOH, A; SEKINO, M

PA (FUJI-I) FUJIWARA M; (HASE-I) HASEBE H; (SATO-I) SATOH A; (SEKI-I) SEKINO M

CYC 1

PI US 2002086216 A1 20020704 (200270)\* 25p H01M010-40

ADT US 2002086216 A1 CIP of US 2001-961138 20010924, US 2001-26816 20011227

PRAI JP 2001-338586 20010928; JP 2000-296074 20000928

IC ICM H01M010-40

ICS H01M002-02; H01M004-58

AB US2002086216 A UPAB: 20021031

NOVELTY - Providing a non-aqueous electrolyte capable of improving the charge-discharge cycle characteristics under high temperatures.

DETAILED DESCRIPTION - A non-aqueous electrolyte comprises **nonaqueous** solvent and solute dissolved in the solvent. The non-aqueous solvent contains main solvent of 20-50 vol.% ethylene carbonate and 40-80 vol.% gamma -butyrolactone, and a third solvent of ethylene sulfite, phenylethylene carbonate, 2-methylfuran, furan, thiophene, or catechol or **vinylethylene carbonate**.

INDEPENDENT CLAIMS are also included for:

(1) non-aqueous electrolyte secondary **batteries** comprising a case (1) having a wall thickness not more than 0.3 mm, a positive and a negative **electrode** (2), and a non-aqueous electrolyte; the **electrodes** and the electrolyte being provided in the case; and

(2) non-aqueous electrolytes.

USE - For non-aqueous secondary **battery** useful in portable apparatus, e.g. portable telephone.

ADVANTAGE - The inventive electrolyte is capable of improving the charge-discharge cycle characteristics under high temperatures. It provides a long cycle life to the secondary **battery** under high temperature environment.

DESCRIPTION OF DRAWING(S) - The figure is a cross sectional view showing a thin type lithium ion secondary **battery**.

Case 1

**Electrode 2**

Dwg.1/3

FS CPI EPI

FA AB; GI

MC CPI: L03-E01C2

EPI: W01-C01D3C; W01-C01E5B; X16-B01F; X16-E01C; X16-F01; X16-J08

L85 ANSWER 10 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2002-566757 [60] WPIX

CR 2003-484002 [46]

DNN N2002-448622 DNC C2002-160711

TI Non-aqueous electrolyte liquid for lithium secondary **batteries** includes non-aqueous solvent in which lithium salt is dissolved for use combined with positive electrode which can occlude and release lithium and

negative electrode.

DC E11 E13 L03 X16

IN FUJII, T; FUSE, T; ISHIGAKI, K; KOMINATO, A; KOTATO, M; SATOU, H;  
SHIGEMATSU, Y; SHIMA, K; WANG, X; YASUKAWA, E

PA (MITU) MITSUBISHI CHEM CORP

CYC 90

PI WO 2002056408 A1 20020718 (200260)\* JA 65p H01M010-40

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ  
NL OA PT SD SE SL SZ TR TZ UG ZM ZW

W: AE AG AL AU BA BB BG BR BZ CA CN CO CR CU CZ DM DZ EC EE GD GE HR  
HU ID IL IN IS KR LC LK LR LT LV MA MG MK MN MX NO NZ OM PH PL RO  
SG SI SK TN TT UA US UZ VN YU ZA ZM

JP 2002203596 A 20020719 (200263) 9p H01M010-40

JP 2002203597 A 20020719 (200263) 10p H01M010-40

CN 1411619 A 20030416 (200346) H01M010-40

JP 2003173819 A 20030620 (200350) 9p H01M010-40

JP 2003187865 A 20030704 (200353) 12p H01M010-40

JP 2003187866 A 20030704 (200353) 15p H01M010-40

JP 2003234127 A 20030822 (200364) 14p H01M010-40

ADT WO 2002056408 A1 WO 2001-JP11630 20011228; JP 2002203596 A JP 2001-80  
20010104; JP 2002203597 A JP 2001-81 20010104; CN 1411619 A CN 2001-806099  
20011228; JP 2003173819 A JP 2001-372550 20011206; JP 2003187865 A JP  
2001-388034 20011220; JP 2003187866 A JP 2001-388035 20011220; JP  
2003234127 A JP 2002-331717 20021115

PRAI JP 2001-388035 20011220; JP 2001-80 20010104; JP 2001-81  
20010104; JP 2001-372549 20011206; JP 2001-372550 20011206; JP  
2001-388034 20011220

IC ICM H01M010-40

ICS H01M004-02; H01M004-38; H01M004-48; H01M004-58

AB WO 200256408 A UPAB: 20031014

NOVELTY - Non-aqueous electrolyte liquid for lithium secondary  
**batteries** includes a non-aqueous solvent in which a lithium salt  
is dissolved for use combined with a positive electrode which can occlude  
and release lithium and a negative electrode. The non-aqueous solvent  
includes (a) a phosphate including (a1) a linear phosphate and (a2) a  
cyclic phosphate, and (b1) a cyclic carboxylate.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a  
lithium secondary **battery** including the non-aqueous electrolyte,  
a positive electrode which can occlude and release lithium and a negative  
electrode.

USE - The non-aqueous electrolyte is used in the production of  
lithium secondary **batteries**.

ADVANTAGE - The electrolyte liquid has flame retardancy  
(self-extinguishing properties) or incombustibility (no flash point), have  
a high conductivity and are electrochemically stable.

DESCRIPTION OF DRAWING(S) - Figure 2 shows the heat stability (cell  
temperature change) of a circular **battery** element using the  
electrolyte. (Drawing contains non-English language text).

Dwg.2/7

FS CPI EPI

FA AB; GI; DCN

MC CPI: E05-A; E05-G07; E05-G09C; E07-A02B; E07-A02G; E07-A03C; E33-G;  
L03-E01C2

EPI: X16-B01F1; X16-J08

L85 ANSWER 11 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2002-561573 [60] WPIX

DNN N2002-444740 DNC C2002-159596

TI Non-aqueous electrolyte for lithium secondary **battery**, is  
provided in **electrochemical cell** containing working

electrode having preset electric potential and strength of reduction peak at preset potential.

DC E19 L03 X16

PA (MITA) MITSUI CHEM INC

CYC 1

PI JP 2002158035 A 20020531 (200260)\* 15p H01M010-40

ADT JP 2002158035 A JP 2000-353543 20001120

PRAI JP 2000-353543 20001120

IC ICM H01M010-40

ICS H01M004-02; H01M004-58

AB JP2002158035 A UPAB: 20020919

NOVELTY - The non-aqueous electrolyte is provided in an **electrochemical cell** containing a working electrode having preset electric potential, and a counter electrode. A highly oriented pyrolytic graphite is provided as a base material of the working electrode, and lithium is used as a reference pole. The strength of the reduction peak of working electrode at 0.6-0.3 V, is less than 200 mu mA/cm<sup>2</sup>.

DETAILED DESCRIPTION - The non-aqueous electrolyte is provided in an **electrochemical cell** containing a working electrode and a counter electrode. A highly oriented pyrolytic graphite is provided as a base material of the working electrode, and lithium is used as a reference pole. The strength of the reduction peak at 0.6-0.3 V, is less than 200 mu mA/cm<sup>2</sup>. The electric potential of the working electrode is 0-3 V at 10 mu V/second at room temperature (25 deg. C).

An INDEPENDENT CLAIM is included for a lithium secondary **battery** containing the non-aqueous electrolyte.

USE - For lithium secondary **battery** (claimed).

ADVANTAGE - Reductive cleavage of the electrolyte during high temperature preservation, is inhibited. The **battery** and the electrolyte have excellent load characteristics and low temperature characteristics.

DESCRIPTION OF DRAWING(S) - The figure shows the first cycle CV measurement value of the electrolyte. (Drawing includes non-English language text).

Dwg.3/8

FS CPI EPI

FA AB; GI; DCN

MC CPI: E06-A03; E06-C; E07-A02C; E07-A04; E10-A09B4; E10-A09B7; E31-K07;

L03-E01C2; L03-E01C4

EPI: X16-B01F1; X16-J02; X16-J08

L85 ANSWER 12 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2002-385369 [42] WPIX

CR 2002-655585 [70]

DNN N2002-301759 DNC C2002-108661

TI Non-aqueous electrolyte for secondary **battery** used in portable telephone, has third solvent from ethylene sulfite, phenylethylene carbonate; 2-methylfuran, furan, thiophene, catechol carbonate, and **vinylethylene carbonate**.

DC E19 L03 X16

IN FUJIWARA, M; HASEBE, H; SATOH, A; SEKINO, M

PA (TOKE) TOSHIBA KK; (FUJI-I) FUJIWARA M; (HASE-I) HASEBE H; (SATO-I) SATOH A; (SEKI-I) SEKINO M

CYC 30

PI EP 1193788 A2 20020403 (200242)\* EN 33p H01M010-40

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT

RO SE SI TR

US 2002064712 A1 20020530 (200242)

H01M010-40

CN 1347166 A 20020501 (200252)

H01M010-40

JP 2002184462 A 20020628 (200258) 20p H01M010-40  
KR 2002025677 A 20020404 (200266) H01M010-40  
ADT EP 1193788 A2 EP 2001-308138 20010925; US 2002064712 A1 US 2001-961138  
20010924; CN 1347166 A CN 2001-132663 20010907; JP 2002184462 A JP  
2001-338586 20010928; KR 2002025677 A KR 2001-54691 20010906

PRAI JP 2000-296074 20000928

IC ICM H01M010-40

ICS H01M002-02; H01M004-02; H01M004-58; H01M010-38; H01M010-44

AB EP 1193788 A UPAB: 20021105

NOVELTY - A non-aqueous electrolyte comprises a non-aqueous solvent containing ethylene carbonate (20-50 vol.%), gamma -butyrolactone (40-80 vol. %), and third solvent(s) from ethylene sulfite, phenylethylene carbonate, 2-methylfuran, furan, thiophene, catechol carbonate, and **vinylethylene carbonate**; and a solute dissolved in the non-aqueous solvent.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a non-aqueous electrolyte secondary **battery** comprising a case (1) having a wall thickness of not more than 0.3 mm, a positive electrode, a negative electrode, and the inventive non-aqueous electrolyte. When a charge-discharge cycle test satisfying conditions (A-D) given below is performed at 45 deg. C, the capacity retention rate at 100th charge-discharge cycle is at least 85% based on the discharge capacity in the first charge-discharge cycle:

(A) for the charging, the constant current-constant voltage charging to 4.2 V is performed for 3 hours under 1 C;

(B) the discharging is performed to 3 V under 1 C;

(C) after the charging, the secondary **battery** is left to stand for 10 minutes, and performing the discharging; and

(D) after the discharging, the secondary **battery** is left to stand for 10 minutes, and performing the charging.

USE - For non-aqueous electrolyte secondary **battery** (claimed), used in portable telephone.

ADVANTAGE - The invention provides a non-aqueous electrolyte capable of improving the charge-discharge cycle characteristics under high temperatures.

DESCRIPTION OF DRAWING(S) - The figure is a sectional view showing a thin type lithium in secondary **battery**.

Case 1

Dwg.1/3

FS CPI EPI

FA AB; GI; DCN

MC CPI: E07-A01; E07-A03C; E07-A04; E07-B01; E10-A09A; E10-A11B2; L03-E01C2;  
L03-E01D1; L03-E07

EPI: X16-B01F; X16-F01; X16-H03; X16-J01A; X16-J02; X16-J08

L85 ANSWER 13 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2001-112354 [12] WPIX

DNN N2001-082500 DNC C2001-033394

TI Non-aqueous electrolytic solution secondary **battery** formed from negative electrode, positive electrode and electrolyte solution formed by dissolving lithium salt in non-aqueous solvent containing **vinylethylene carbonate**.

DC E13 L03 X16

IN FUJII, T; KOTATO, M; SHIMA, N; SUZUKI, H

PA (MITU) MITSUBISHI CHEM CORP

CYC 22

PI WO 2000079632 A1 20001228 (200112)\* JA 29p H01M010-40

RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE

W: CN US

JP 2001006729 A 20010412 (200118) 7p H01M010-40

JP 2001126761 A 20010511 (200133) 8p H01M010-40  
EP 1205996 A1 20020515 (200239) EN H01M010-40  
R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE  
CN 1370335 A 20020918 (200303) H01M010-40  
ADT WO 2000079632 A1 WO 2000-JP3910 20000615; JP 2001006729 A JP 1999-172405  
19990618; JP 2001126761 A JP 1999-304847 19991027; EP 1205996 A1 EP  
2000-937252 20000615, WO 2000-JP3910 20000615; CN 1370335 A CN 2000-811804  
20000615  
FDT EP 1205996 A1 Based on WO 2000079632  
PRAI JP 1999-304847 19991027; JP 1999-172405 19990618  
IC ICM H01M010-40  
AB WO 200079632 A UPAB: 20010302  
NOVELTY - Non-aqueous electrolytic solution-type secondary **battery**  
is formed from a negative electrode, a positive electrode and an  
electrolyte solution formed by dissolving a lithium salt in a non-aqueous  
solvent. The non-aqueous solvent contains 0.01-20 weight% of a  
**vinyl-ethylene carbonate**.  
DETAILED DESCRIPTION - The **vinyl-ethylene**  
**carbonate** is of formula (I).  
R1-6 = H atom or 1-4C alkyl group.  
An INDEPENDENT CLAIM is also included for a non-aqueous electrolytic  
solution for a non-aqueous electrolytic solution secondary **battery**  
which has a negative electrode which absorbs and releases lithium and a  
positive electrode.  
USE - Used as a non-aqueous electrolytic secondary **battery**.  
ADVANTAGE - The **battery** shows minimal decomposition of an  
electrolytic solution, high capacity and has excellent storage  
characteristics and cycle characteristics at high temperature. The size of  
the **battery** is reduced.  
Dwg.0/3  
FS CPI EPI  
FA AB; GI; DCN  
MC CPI: E05-A; E07-A04; E31-C; E31-K07; E31-Q06; L03-E01C  
EPI: X16-B01F; X16-J02; X16-J08  
  
L85 ANSWER 14 OF 14 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN  
AN 2000-324339 [28] WPIX  
DNN N2000-244010 DNC C2000-098467  
TI Non-aqueous electrolyte secondary **battery** e.g. lithium secondary  
**battery**, has electrolyte with specific amount of phosphate, cyclic  
carbonate or at least one kind of carbonate **polymer**.  
DC A85 L03 X16  
PA (HITM) HITACHI MAXELL KK  
CYC 1  
PI JP 2000100472 A 20000407 (200028)\* 7p H01M010-40  
ADT JP 2000100472 A JP 1998-272648 19980928  
PRAI JP 1998-272648 19980928  
IC ICM H01M010-40  
ICS H01M004-02; H01M004-58  
AB JP2000100472 A UPAB: 20000613  
NOVELTY - The secondary **battery** has a cathode (2) containing  
fibrous spherical shaped **graphite** as active material. The aspect  
ratio of **graphite** is 5 or less. The electrolyte of  
**battery** contains 30% or more of phosphate, 30% or less of cyclic  
carbonate or at least one kind of 2% or more of carbonate **polymer**  
, in volume ratio.  
USE - Non-aqueous electrolyte secondary **battery** e.g.  
lithium secondary **battery**.  
ADVANTAGE - The secondary **battery** excels in load  
characteristics and has high charging and discharging efficiency.

DESCRIPTION OF DRAWING(S) - The figure shows sectional drawing of  
non-aqueous electrolyte secondary **battery**.

Cathode 2

Dwg.1/1

FS CPI EPI

FA AB; GI

MC CPI: A12-E06; L03-E01C

EPI: X16-B01F1; X16-J02; X16-J08